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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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SUMMARY OF RECENT ABSTRACTS*

VII. HELMINTHIASIS.

General.

Surveys of intestinal parasites are reported by RENAULT & VERSIANI and by CANÇADO (p. 5) from Bello Horizonte in Brazil. Agreement between them is fairly good for Ascaris (19·8 and 19·2 per cent. positive respectively) and Necator (16·99 and 15·2) but not for Strongyloides (17·26 and 8·2), *Schistosoma mansoni* (10·88 and 2·3), *Entamoeba histolytica* (8·33 and 12·5) and certain other protozoa. [In each investigation the specimens were taken from persons of all ages; the first-named authors regard their figures as representing the incidence in the working class, but Cançado makes no such claim, since most specimens came from persons under medical care. It seems likely, however, that the two series are fairly comparable, but it appears that far more of the second series were examined by concentration methods than of the first, though special search was made for *S. mansoni* in the first series. No doubt the methods used were dictated primarily in the interest of diagnosis in the individual patients, but the comparison seems to bring out the point that for epidemiological surveys some constant procedure should be adopted.]

MOHR (p. 859) gives an account of the helminth infections seen in Germans who had returned to Germany from Africa. In children hookworm infection was the most common, and in other persons *T. saginata*, the schistosomes and the filariae were found. He notes that eosinophilia was often present in the absence of worm infections.

SENRA (p. 698) describes a modification of the method of Hoffmann, Pons and Janer for demonstrating helminth eggs in faeces. This cannot further be abstracted; details are given in the summary.

Immunity.—ACKERT (p. 624) has written a comprehensive account of the factors concerned in natural resistance to helminthic infections. Dietary factors, genetic constitution and age are concerned. It is not possible to condense further the admirable review of this paper, written by the late Professor Warrington YORKE.

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1942, Vol. 39. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

HEARIN (p. 93) has demonstrated, in mice, a high degree of acquired resistance against reinfection with *Hymenolepis nana* var. *fraterna*. This immunity, which persists for at least 141 days after removal of the worms, is not stimulated by introducing adult worms into the intestine by operation, but can be induced by repeated intraperitoneal injection of immune serum. It is produced by the normal process of infection, and results from the development of humoral antibodies.

Anthelmintics.—DAVEY and INNES (p. 861) give a valuable summary of the present position of phenothiazine as an anthelmintic in animals and man. They quote from various authors the accounts of toxicity in man, showing that eight patients out of 220 have exhibited toxic effects, and they state that the doses advocated in early work were too high.

DEEDS and THOMAS (p. 6) have made a study of phenothiazine. This drug is oxidized to leucothionol and thionol, and after administration of phenothiazine by the mouth all three substances are found in the faeces and also in the bile. *In vitro*, phenothiazine has no demonstrable action on *Ascaris lumbricoides*, but thionol first stimulates and then depresses the worm; this depressant action of thionol is increased by bile.

Phenothiazine is rapidly eliminated from the body, and half is excreted unchanged in the faeces. SCHNITZER *et al.* (p. 862) have devised a method of purification and have tested their product on animals. In the doses given [for which the original abstract should be consulted] phenothiazine showed no toxicity for white mice, but guineapigs and dogs did not tolerate it so well, the latter showing transient anaemia.

Evidence of toxicity in man is plentiful; the following accounts show that this drug is potentially highly dangerous. In the *Lancet* (p. 193) is discussed the death of an apparently healthy child after having taken 8·5 gm. of phenothiazine; post-mortem findings and clinical tests indicated haemolytic anaemia as the cause of death. HUBBLE (p. 464) reports serious anaemia and toxic hepatitis in children as a result of the administration of phenothiazine. The drug is efficient, but in view of its toxicity its use in a trivial infection such as enterobiasis can hardly be justified. JOHNSTONE (p. 560) reports severe blood destruction in a child who had been given 10 gm. of phenothiazine in five days. He quotes toxic reactions in eight of 58 persons treated for threadworms, and he also concludes that in face of such a high incidence the use of the drug cannot be justified. On the other hand KUITUNEN-EKBAUM (p. 192), as a result of experience with 89 children and 9 adults, considers phenothiazine, in moderate doses, to be an effective and safe remedy for *E. vermicularis* infection. The doses given to children varied from 2·5 to 8 gm.

SCHMIDT *et al.* (p. 465) consider that, at present, phenothiazine cannot be considered a safe anthelmintic for horses. ERRINGTON (p. 6) refers to the toxic effects of phenothiazine in horses, and reports that it has given rise to anaemia, albuminuria and haemoglobinuria. As an anthelmintic it is effective, but he advises caution in dosage.

SANDGROUND (p. 7) reports two cases of coma following the administration of tetrachlorethylene in doses of 4·5 cc. and 3 cc. respectively. In each case the coma was transient and resembled the anaesthesia produced by chloroform. It is noted that 3 cc. is smaller than doses which had previously been given to other persons without producing coma, and that the man who received this dose and became

unconscious was healthy and well developed. The author recalls the remark of HALL that one cannot assume that any anthelmintic is entirely safe for human use until there are reliable reports on at least a million treatments without any untoward effects.

ESKOLA (p. 864) discusses the toxicity of Filix mas and other remedies used for the expulsion of tapeworms ; details must be sought in the original abstract. He advocates rather smaller doses of male fern than are commonly used, but this may be due to the fact that the Finnish preparation contains a relatively high proportion of the active principle.

OELKERS and RATHJE (p. 767) give an account of *in vitro* experiments with a number of anthelmintics, and of estimations of their toxicity to animals. The details cannot further be abstracted.

MARTIN *et al.* (p. 464) have studied methods of detoxication of anthelmintics, the process of which follows one of three lines :—oxidation, reduction or conjugation. The method of conjugation is one of enzymatic action, and the toxicity of ascaridole, aspidium and tetrachlorethylene can be markedly decreased by the concomitant administration of ascorbic acid, glycine, glucuronic acid or cystine. If these are given somewhat later than the drugs, interference with the anthelmintic action can be avoided.

Trematodes.

Schistosomiasis.—BAUGÉ (p. 768) describes a focus of schistosomiasis (*haematobium*) in Southern Tunisia ; anthiomaline was satisfactory in treatment, and copper sulphate was useful in the destruction of snails.

GELFAND (p. 699) points out that schistosomiasis in S. Rhodesia is a chronic inflammatory disease and that the symptoms may therefore be constitutional, with fever, loss of weight, and eosinophilia. Signs of disease of the liver, spleen, appendix, Fallopian tubes, testes, and especially bladder or bowel should always, in that country, lead to suspicion of schistosomiasis. He quotes a number of cases in which the symptoms were very varied.

MOZLEY (p. 11) writes of the use of malachite (mineralized basic copper carbonate) for the destruction of the snail hosts of schistosomes. Finely crushed malachite introduced into water is quite effective for this purpose in the laboratory and in the field. It is found in S. Rhodesia and is fairly cheap.

Schistosomiasis is one of the most important problems of Venezuela. SCOTT (p. 865) reports that in some places all the people become infected by the age of 10 years ; in others one-quarter of the inhabitants are infected. There is, however, only one endemic area, the central part of the northern coastal range, where *Australorbis glabratus* (*P. guadeloupensis*) is to be found. Most of these snails are found in stagnant water ; they survive well in canals used only a few days each week, but not in canals which dry quickly and completely between irrigation periods. Pollution of water in the fields, by defaecation, is exceedingly common. Scott considers that large-scale treatment of the people is not a useful measure of control, and advocates that steps be taken to reduce the number of snails ; minor changes in irrigation practice, such as those indicated by the author in an earlier paper [this *Bulletin*, 1940, Vol. 37, p. 484] might be effective. [It should be noted that Scott refers to mass treatment as a measure of control ; treatment should obviously be given as widely as possible for the relief

of individual sufferers, but in his opinion this will not prevent the continued spread of the disease.]

BRUMPT (pp. 8, 866) has made a study of the biology of *Planorbis* (*Australorbis*) *glabratus* in Venezuela, and has proposed measures of control. Prevention of promiscuous defaecation has proved impracticable in control of schistosomiasis in that country, treatment of infected persons is disappointing in practice, and the only hopeful procedure is to eliminate the snail. This may be done by various methods. Useless collections of water should be removed; irrigation canals and drains should be replaced by cement drains; sea water in a strength of 35–40 per cent. maintained for several days will destroy the snails; copper sulphate or carbonate, quicklime or ammonium sulphate may be used; acclimatized *Balanites aegyptiaca* may be planted beside open water. Alternate drying and filling of the canals is not effective; Brumpt's studies showed that these snails have considerable resistance to drying, and that a large proportion, in one laboratory experiment, remained alive after 50 days of drying more severe than is encountered in nature.

VOGEL (p. 563) has succeeded in infecting a large proportion of Planorbis and Oncomelania snails each with a single cercaria of *S. mansoni* or *S. japonicum*.

KOPPISCH (p. 563) describes the fundamental histopathological unit of schistosomiasis (*mansoni*) as the pseudo-tubercle, which develops about the ova. This contains eosinophils and polymorphonuclear cells in the early stage, with, later, epithelioid cells; and it finally undergoes fibrosis. The disease is primarily hepatic and colonic and the pathological changes are instigated mainly by deposition of ova in the tissues. Cirrhosis is periportal in distribution, and splenomegaly is at least partly due to the hepatic cirrhosis. In the late stages there is great similarity between schistosomiasis and Banti's disease, but pulmonary symptoms may be prominent in the former.

ORTIZ (p. 465) notes that in *S. mansoni* infection fever may be found in the early stage (of invasion and distribution of the larvae) or later when the infection has become chronic and the liver can no longer deal with the toxins, or when intestinal lesions have admitted bacteria to the blood and kidneys. He found early fever, sometimes simulating typhoid, in 21 per cent., and late fever in 78 per cent. of cases.

CARLISLE (p. 628) discusses schistosomiasis of the appendix, which may be a chronic condition, devoid of characteristic features, but in which acute or subacute exacerbations frequently occur, and may lead to gangrene or perforation. MEIRA (p. 9) discusses the diagnosis of rectal schistosomiasis by means of sigmoidoscopy and radiology; no lesions diagnostically specific were generally seen, and the author points out that examination of the faeces is essential. GELFAND (p. 10) describes two cases of schistosomiasis (*mansoni*) of the Fallopian tubes.

ESPIN (p. 466) reports a case of myelitis, with paraplegia, caused by the tissue reaction to eggs of *S. mansoni* in the dorso-lumbar region of the spinal cord.

MAGALHÃES and COELHO (p. 10) describe eight cases of hepatic cirrhosis with primary malignancy; in five of these *S. mansoni* infection was present. It is considered that the toxins of the worm exert the cancerogenic effect, and that these toxins reach the liver by the portal vein. Rectal schistosomiasis associated with rectal carcinoma is rare, but benign tumours may develop as a result of the energetic connective tissue reaction stimulated by the eggs.

RISQUEZ and BOZA (p. 560) state that an antigen prepared from cercariae of *S. mansoni* obtained from *Planorbis guadeloupensis* has given positive reactions in a skin test in all patients tested who were suffering from schistosomiasis. They do not give details of methods of preparation.

KRAKOWER *et al.* (p. 562) have shown that whereas in rats infected with *S. mansoni* and kept on a normal diet there is marked destruction of the parasite in the liver, the maximum being between the 5th and 7th weeks after infection, in rats maintained on a diet deficient in vitamin A this destruction is either minimal or absent. They discuss the possible mechanism by which destruction is brought about.

ZELLWEGER (p. 870) reports a considerable incidence of *Schistosoma intercalatum* infection in parts of Gabon. He describes the symptoms associated with the early (acute) stage and the later (subacute) phase. These are not unlike those found in *S. mansoni* infections. In treatment Fouadin and anthiomaline are satisfactory.

VOGEL (p. 700) has described the development, length of life, and death of the eggs of *S. japonicum* in animals. It appears that the maximum life of the eggs is 21 days, of which 9–10 are occupied in development; mature miracidia can therefore live only 11–12 days.

BONNE *et al.* (p. 628) found infection with *S. japonicum* in man, dog and deer in the Lake Lindoe region of Celebes, but no snails of the genus Oncomelania could be discovered. There is a suspicion that Lymnaea snails may play a part in this infection but this has not been proved; cercariae, which gave rise to schistosomes in mice, have been obtained from these snails, but the worms could not be identified as *S. japonicum.*

An account is given in the *Monthly Bulletin*, Manila (p. 468) of the incidence of schistosomiasis in the Provinces of Surigao, Leyte and Mindoro, where 6·7 to 9·7 of dispensary patients were found to be infected. Most of the cases were in children aged 5–15, at which period there is the greatest exposure to parasite-infested waters. The chief clinical findings are enumerated; treatment consists of administration of Fouadin and emetine. DIÑO *et al.* (p. 466) report 14 cases from the Philippines in which appendicitis was due to the presence of eggs of *S. japonicum* in the wall of the appendix [see also CARLISLE above]. Round the eggs were tubercles similar to those caused by the tubercle bacillus, and visible to the naked eye [see also KOPPISCH above]. This infection induces chronic inflammation with some obstruction, and in acute cases secondary infection occurs. In only two of these cases were eggs found in the faeces before operation.

VITUG *et al.* (p. 11) describe two cases of *S. japonicum* infection with cerebral involvement; one patient died but the other recovered after treatment with Fouadin.

TUBANGUI and AGUILA (p. 467) report cure in 10 of 19 cases of *S. japonicum* infection treated with Fouadin.

AFRICA and GARCIA (p. 467) found mature *S. japonicum* in the inferior vena cava and right auricle of two experimentally infected monkeys. They discuss the possible route by which the worms reached the right heart.

PENNER (p. 769) states that *Schistosomatium pathlocopticum* is the same as *S. douthitti*, the cercariae of which can produce swimmers' itch, and the natural host of which is the field mouse. He discusses the distribution, snail hosts and control of this trematode. MILLER (p. 12) reports that, in the control of schistosome dermatitis, the use of a solution

containing copper sulphate and copper carbonate, which is syphoned from a boat on to the lake bottom so that 50 lb. copper sulphate and 25 lb. copper carbonate are used for each 25,000 square feet of beach, is enough to prevent the itch. A similar conclusion is reported on pp. 566 and 567.

Other trematodes.—BERGE *et al.* (p. 703), in reporting a case of *Fasciola hepatica* infection in Tunis, emphasize the dominant signs of eosinophilia (up to 66 per cent. in the later stages), colic without fever, and loss of weight without anaemia. The liver was slightly enlarged. In this patient duodenal intubation revealed the eggs of the fluke, which were not found in the faeces. Treatment with emetine and neosalvarsan was ineffective and the prognosis was grave. They point out the danger of eating watercress of unknown origin. SHAW and CLYNE (p. 14) record the finding of *Fasciola hepatica* in a subcutaneous nodule over a rib. In comment, LANE gives his opinion that the fluke had probably not escaped from the liver but that the cercaria had strayed, in a non-optimum host, and become detained in this subcutaneous position, never having reached the liver.

DAENGSVANG and MANGALASMAYA (p. 564) report a family, all the members of which were infected with *Fasciolopsis buskii*, in Thailand. One child suffered from diarrhoea, ascites, oedema of the face and legs and wasting, but the others had mild gastro-intestinal disorders only. Oil of chenopodium appeared to be a useful anthelmintic. GALLIARD and DANG-VAN-NGU (p. 13) report a few cases of human infection with *Fasciolopsis buskii* in Tonking, where pigs are heavily infected.

RO and YOKOGAWA (p. 13) describe the changes in *Paragonimus westermanii* which resulted from the combined treatment of infected dogs by emetine and Prontosil [see this *Bulletin*, 1941, Vol. 38, p. 47]. Disintegration of the flukes was seen in cases in which eggs disappeared from the sputum.

NASR (p. 770) has found the fluke *Prohemistomum vivax* in the intestine of man in Egypt ; it is exceedingly common in dogs and cats which eat fresh water fish from the Nile. The intermediate hosts are the snails *Cleopatra bulimoides* and *Melanopsis praemorsa*, and the fish *Tilapia nilotica*, and species of mullet. The worm has a short life but may, apparently, give rise to dysenteric symptoms. It seems to be limited to Egypt and Palestine.

SCOLARI and OCAÑA (p. 565) have extracted a distome from the subcutaneous tissues of a child in Argentina ; identification of species was not completed.

BONNE (p. 14) has reinvestigated the question of *Echinostoma lindoense* infection of man round Lake Lindoe in Central Celebes. The first intermediate host of this fluke is the snail *Anisus sarasinorum*, the second intermediate host is usually the mussel *Corbicula linduensis*, which is eaten by the lake-side people. *Corbicula celebensis* may also act as second intermediate host, but the cercariae of *Echinostoma lindoense* from *Anisus sarasinorum* apparently prefer *Corbicula linduensis*. No reservoir host has been found and the author does not consider that *E. lindoense* and *E. revolutum* (a natural parasite o ducks) are identical ; there is an ideal adaptation between man, mussel and echinostome, and the infection of mussels, round Lake Lindoe, with metacercariae of *E. lindoense* can probably be completely explained by the presence of foci of human infection in the three lake-side villages. There is, however, a species of Echinostoma which

differs in some respects and which is developed in animals fed on the mussel *Corbicula linduensis*; this species has not been found in man, and there must be an animal host. BONNE *et al.* (p. 629) make a further detailed statement, on similar lines, of the hosts of *Echinostoma lindoense* and of other related trematodes in Celebes.

BONNE (p. 565) gives a diagnostic table for the four echinostomes found in man in the Netherlands Indies:—*Euparyphium ilocanum* (reservoir field rat), *Echinostoma lindoense* (no animal reservoir known), *Euparyphium malayanum* and *E. recurvatum*, both of which have been found in man once only.

Cestodes.

BRANDT (p. 90) describes a method for the differential staining of hooklets of tapeworms by means of hot methyl violet or basic fuchsin. Details are given in the original abstract.

MUELLER and COULSTON (p. 89) inoculated themselves subcutaneously with spargana of *Spirometra mansonoides*, obtained from a monkey, and the larvae were excised after periods of 68, 69 and 98 days. One, when tested, was able to continue its natural evolution in the cat. The larvae migrated from time to time in the tissues of the experimenters, and at these times general symptoms of urticaria were produced, probably owing to the release of toxins from the site of encapsulation. Eosinophilia was present, and skin reactions to antigens from the same and other species were positive and remained so for at least 20 months after removal. Complement fixation tests were unsatisfactory. *S. mansonoides* is therefore a potential human parasite, and may "render swimming in certain natural bodies of water carrying the intermediate copepod host; or the use of shallow well or spring water, etc., dangerous."

ITAKURA (p. 90) reports a case of human sparganosis in Okayama.

Russian scientists (p. 567) have described the life-cycle of *Diphyllobothrium minus*, a human tapeworm endemic in the Lake Baikal area. Species of Cyclops, and fresh water fish, are the intermediate hosts.

TRELLES and LAZARTE (p. 468) give an account of the microscopic pathology of cerebral cysticercosis. The three main clinical conditions are convulsions, raised intracranial pressure and psychic changes, but all are subject to great variation. In diagnosis X-ray may help when the cysts are calcified, and biopsy of a cyst is diagnostic. Surgical treatment guided by localizing symptoms has been useful, but the multiplicity of cysts, of course, restricts its value. Prevention consists of prompt treatment of worm infestation and the supervision of meat. EWING (p. 92) describes the post-mortem appearances in a case of cysticercus epilepsy. DICKSON and WILLS (p. 92) remark that in a case of cysticercus epilepsy they found the unusual features of grossly raised intracranial pressure, rapidly increasing papilloedema, with a normal ventriculogram. In a case of cerebral cysticercosis GRANA and SCHENONE (p. 705) noted that the cerebrospinal fluid was not clear, showed a high degree of eosinophilia (32 per cent. in one case), and contained an excess of glucose.

Remarking on the rarity of cerebral cysticercosis in childhood, SALDUN DE RODRIGUEZ *et al.* (p. 704) report a case in a girl of 14, who had had attacks of epilepsy since the age of 11.

BRAILSFORD (pp. 91, 705) discusses human infection with *Cysticercus cellulosae,* usually, in Britain, seen in men who have served in India; calcification of the cyst does not usually take place until after a "blind" period of about five years.

CULBERTSON and GREENFIELD (p. 631) report that although atebrin, given prophylactically, has some retarding action on the development of *Cysticercus fasciolaris* in the mouse, its curative action is not significant. The drug cannot be regarded as useful in treatment of human cysticercosis, but one of the other acridine derivatives might serve the purpose.

CLAPHAM (p. 631) reports a case of infection of the human brain with *Coenurus cerebralis.* This is apparently the second instance to be recorded. CANNON (p. 872) also reports a case of human infection with a species of Coenurus, in an African. This formed a swelling in the forearm, which was removed under local anaesthesia.

BARNETT (p. 469) gives figures of the incidence of hydatid disease in New Zealand; in general there is a rising incidence in man. About one-third of the dogs in rural areas harbour the worm, but in town dogs infection is very rare.

MEADE and BARNETT (p. 470) report from New Zealand a case in which alveolar hydatid disease was associated with the ordinary form of liver hydatid. The alveolar type was similar to the forms which have been found sporadically outside the Bavaro-Tyrolean endemic area. Barnett discusses the origin of this type, and inclines to the opinion that there is no necessity to postulate the existence of two different varieties of *Echinococcus granulosus.* The change to the alveolar type may be due to a malignancy mutation brought about by something corresponding to a carcinogenic factor.

Hydatid disease is common in Concepcion, Chile, and WILHELM (p. 469) reports that 38 per cent. of dogs have been found to harbour the adult worm.

BARNETT (p. 95) discusses multiple peritoneal hydatid cysts. Rupture of a cyst releases enormous numbers of scoleces, most of which die, but which tend to settle in the pelvis. Prognosis is not so bad as is generally assumed; the author gives advice on surgical treatment. REAY (p. 470) discusses hydatid disease of the kidney, from the surgical point of view.

SENEKJI (p. 93) describes the preparation of a polysaccharide antigen from the scolex material of hydatid cysts. In the Casoni test this substance, which can be prepared in large quantities and which keeps well, gives uniform and reliable results. The author points out that there may be considerable differences in the potency, for this test, of hydatid fluid from animals, and the uniformity of the polysaccharide antigen is an advantage. Details of the method of preparation are given. GREVAL *et al.* (p. 94) state that pooled fluid from hydatid cysts, treated with 0·5 per cent. of a mixture of equal parts of ether and tricresol, acts as a reliable and stable antigen for the complement fixation test. This test can be used to measure the retrogression of hydatid disease resulting from non-surgical treatment. CULBERTSON and ROSE (p. 95) state that antigens suitable for use in skin tests in hydatid disease can be derived from cestodes of many genera and species; they give a list of some of these. *Charles Wilcocks.*

[*To be continued.*]

MALARIA.

MacNalty (Arthur). **Indigenous Malaria in Great Britain.**—*Nature.* 1943. Apr. 17. Vol. 151. No. 3833. pp. 440–442.

Nichols (J. B.). **Recent Mortality from Malaria in the United States.**—*Virginia Med. Monthly.* Richmond. 1942. Dec. Vol. 69. p. 681. [Summary taken from *Jl. Amer. Med. Assoc.* 1943. Feb. 13. Vol. 121. No. 7. p. 544.]

In 1900 the death rate for malaria in the census registration area of the United States was 7·9 per hundred thousand. Under the vigorous antimalarial procedures then instituted the rate declined to 3·9 in 1905. From 1905 to 1937 the rate fluctuated from 3·8 to a minimum of 1·9 in 1926, without much change in the general trend. The statistics for 1938, 1939 and 1940 show such a significant change in the trend that Nichols presents them. For 1938 the death rate was 1·8, for 1939 it was 1·3, and for 1940 it was 1·1. The annual mortality for the entire period 1930 to 1940 shows that since 1937 there has been a sharp and continued decrease in mortality from malaria in the United States. This suggests that new conditions antagonistic to the disease have been established. The most obvious explanation for the decrease in mortality is that it was the result of the energetic and extensive antimalarial measures that were being carried out in the South, where most of the deaths from malaria in the United States occur.

Pinto (Cesar) & Clausell (D. T.). Contribuição ao estudo da malária quartã (" Plasmodium malariae "). Novos fócos em Minas Gerais, Brasil. [**New Focus of** *P. malariae* **Infection in the State of Minas Gerais, Brazil.**]—*Rev. Brasileira Biol.* Rio de Janeiro. 1942. Dec. Vol. 2. No. 4. pp. 489–494. With 5 figs. (1 map).

A health survey of the labour forces engaged on road construction on the Rio-Baia highway in the valley of the Rio Doce in the State of Minas Gerais was made in August and September 1942. The blood of 590 of these workers was examined ; malaria parasites were found in 38—*P. falciparum* 17, *P. vivax* 13, *P. malariae* 5, *P. malariae* and *P. falciparum* 1, *P. falciparum* and *P. vivax* 2. Details are given concerning all six patients with *P. malariae* infection. One of these, a boy aged 14, harboured also *Necator americanus*, *Ascaris lumbricoides*, *Trichuris trichiura* and *Schistosoma mansoni*. The endemicity of schistosomiasis in this valley detracts from the value of the spleen index as a measure of malarial endemicity. Epidemiologically *A. darlingi* and *A. tarsimaculatus* are suspected vectors of *P. malariae*. Four other Anopheles have been encountered locally, *A. albitarsis*, *A. evansi*, *A. argyritarsis* and *A. minor*. *Norman White.*

Causey (O. R.). **A Method for the Collection, Transportation and Study of Anopheline Eggs and Adults.**—*Amer. Jl. Trop. Med.* 1943. Jan. Vol. 23. No. 1. pp. 133–137. With 6 figs. on 2 plates.

The author describes a method by which large numbers of egg batches correctly associated with the female which produced them can be transmitted from the field to a central laboratory. Single wild-

caught females oviposit in vials measuring 2×5 cm. plugged with cotton wool. The female is chloroformed and placed in a numbered starch capsule. The eggs are filtered off through a filter paper bearing the same number and the partially dried filter paper folded and fastened together with a stapler. Large numbers of such collections are packed in a single container and the eggs are said to remain viable "for a number of days." *V. B. Wigglesworth.*

BRIGHENTI (D.). Osservazioni biologiche sugli anofeli. Sull' *Anopheles* (*Myzomyia*) *pseudopictus*. [**Biological Observations on** *A. hyrcanus* **var.** *pseudopictus*.]—*Boll. Soc. ital. Biol. sper.* Naples. 1942. Vol. 27. No. 4. pp. 284–285. [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Apr. Vol. 31. Pt. 4. p. 78.]

The author describes white rings that he has observed on the antennal segments of examples of *Anopheles hyrcanus* var. *pseudopictus*, Grassi, taken by him in rice-fields and along the Adriatic coast in Italy. They have not previously been described in this variety, which he regards as a distinct species. He states that it differs from other Anophelines in the attitude in which it rests on walls, since its body is always extended at right angles to the surface. It is never found on the ceilings or upper part of the walls of houses and animal quarters, but only on the lower portions of the walls, not more than 5 ft. from the floor. It is negatively phototropic.

CAUSEY (O. R.), DEANE (L. M.) & DEANE (M. P.). **Ecology of** *Anopheles gambiae* **in Brazil.**—*Amer. Jl. Trop. Med.* 1943. Jan. Vol. 23. No. 1. pp. 73–94.

This paper contains a very large amount of information about the biology of *Anopheles gambiae* in Brazil, collected during the campaign for the extermination of this mosquito from 1940 onwards. Only the light-coloured variety of *A. gambiae*, which breeds in fresh water, was introduced into Brazil. Detailed observations made in the laboratory on its oviposition habits, number of eggs, duration of early stages, longevity, and so forth, are here recorded. Observations and experiments in the field showed that the habits of *A. gambiae* in Brazil were the same as in Africa. It bred in small collections of fresh water, comparatively free from vegetation, fully exposed to the sun and usually near human dwellings. The larvae were never found in brackish water, although in the laboratory development could take place in up to one per cent. sodium chloride concentration. The adults entered houses only when occupied by man and they showed a very decided preference for feeding on human blood [*cf.* this *Bulletin*, 1942, Vol. 39, p. 595]. Even in moist regions more than four-fifths of the mosquito population in a given house changed within 24 hours; and in hot dry regions a still greater migration took place. In the experimental areas the infection rate of *A. gambiae* was 5·6 per cent., compared with 1·5 per cent. in a species of the *tarsimaculatus* group, and nil in *A. albitarsis*.

V. B. Wigglesworth.

DEANE (M. P.) & CAUSEY (O. R.). **Viability of *Anopheles gambiae* Eggs and Morphology of Unusual Types found in Brazil.**—*Amer. Jl. Trop. Med.* 1943. Jan. Vol. 23. No. 1. pp. 95–103. With 6 figs.

In order to test the possibility of the eggs of *A. gambiae* surviving for long periods in moist shaded sand or mud, large numbers of experiments were carried out in the laboratory. After storage for 14–18 days in moist sand only a fraction of one per cent. of the eggs hatched. None survived longer storage. After keeping in drying sand for 18 days one per cent. of the eggs hatched. It was evident in these experiments that most of the eggs became non-viable about 12 days after oviposition, but that there was a very small percentage of resistant eggs. In further experiments it was found that if the females were kept at low temperatures (10–13°C.) for three or more days after a blood meal they laid an abnormal type of egg in which a reticulated exochorion extends over the entire dorsal surface. These eggs resemble the resistant winter eggs described by HURLBUT in *A. walkeri*. [*Jl. Parasitology*, 1938, Vol. 24, p. 521.] *V. B. Wigglesworth.*

GOODWIN (Melvin H.), Jr. **Studies on Artificial Resting Places of *Anopheles quadrimaculatus* Say.**—*Jl. National Malaria Soc.* Tallahassee, Fla. 1942. Vol. 1. No. 1. pp. 93–99.

With the object of comparing the density of populations of mosquitoes in different localities attempts have been made in recent years to devise standard types of artificial daytime resting places. The most successful of these so far has been the small nail keg (see this *Bulletin*, 1942, Vol. 39, p. 811). The author describes a new type which consists of a cubical wooden box with a 12-inch side, open at one end. These boxes were less attractive than the natural resting places (animal shelters, sheds, privies, hollow trees, culverts, etc.) but they attracted more mosquitoes than did the nail kegs. They were more attractive if painted red inside and out than if painted black. No significant difference appeared when the boxes were pointed in different directions, and there was little difference between boxes at varying heights up to six feet above the ground, though when vertical tiers of boxes were available the mosquitoes preferred those within 3 feet of the ground. *V. B. Wigglesworth.*

LUND (Horace O.). **Studies on the Choice of a Medium for Oviposition by *Anopheles quadrimaculatus* Say.**—*Jl. National Malaria Soc.* Tallahassee, Fla. 1942. Vol. 1. No. 1. pp. 101–111. With 2 figs.

Experiments were made in a cage in the laboratory in which females of *Anopheles quadrimaculatus* were offered dishes of water, differing in various respects, with the object of discovering by what factors the female is influenced in selecting water for oviposition. It was found that in a dim light, gravid females of *A. quadrimaculatus* chose dark, rather than light, containers in which to lay their eggs. But no significant differences could be demonstrated when many other factors were compared; for example, hardness of water, concentration of calcium ions, muddiness, presence of algae, salinity, phosphorus or ammonia content, tannic acid content, *p*H, presence of ferric or aluminium chloride, etc. *V. B. Wigglesworth.*

KOPP (Israel) & SOLOMON (Harry C.). **Liver Function in Therapeutic Malaria.**—*Amer. Jl. Med. Sci.* 1943. Jan. Vol. 205. No. 1. pp. 90–97. [24 refs.]

In a study of the effects of long-continued administration of tryparsamide upon the liver it was necessary to determine the effect that malaria therapy, to which the patients in question were submitted, had upon liver function. This paper records the results of the study of nine patients. Liver function was determined before and after malarial therapy. The patients were inoculated with *P. vivax*. They were allowed to have from 4 to 12 paroxysms of malaria after which 30 grains of quinine were given daily for a week. Liver function was determined by the following procedures: bromsulphthalein dye test; cholesterol, total, free, and ester; phospholipids; hippuric acid excretion; cephalin cholesterol flocculation test of Hanger; fibrinogen; total bilirubin; van den Bergh reaction; icteric index. The technique used in carrying out these tests is described.

The disturbance of liver function caused by malaria was shown by moderate bromsulphthalein retention, a marked reduction in cholesterol and cholesterol esters, a moderate fall in the phospholipids, diminished hippuric acid excretion, and a strongly positive cephalin flocculation test. The impairment of liver function was transient; function was fully restored from 3 to 6 weeks after the termination of the malaria. The cephalin flocculation test was the last to return to normal. The administration of pentavalent arsenic, tryparsamide, did not seem to delay the appearance of normal reactions except for the cephalin flocculation test. Jaundice occasionally appears when arsenicals are given after recovery from malaria. This is possibly due to the overburdening of the liver before normal function of that organ has been restored. This danger is probably less with pentavalent than with the trivalent arsenical preparations, neoarsphenamine, mapharsen and arsphenamine, considerable quantities of which are excreted by the liver. *Norman White.*

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. 1943. Mar. 6. Vol. 121. No. 10. p. 765.—**Mental Symptoms following the Use of Atabrine.**

This is a short editorial in which reference is made to the discussion by Field [this *Bulletin*, 1939, Vol. 36, p. 872] on the occasional mental effects of atebrin. The editorial points out that the incidence of mental symptoms has been equally small in the Western Hemisphere, and that there have been no reports of these occurring as a result of administration of the drug in prophylactic dosage. It is also pointed out that confusional psychoses sometimes occur as a direct result of malaria, and that it should not, therefore, be assumed that every mental aberration following treatment with atebrin is necessarily due to the drug. Under present circumstances the Surgeon General, United States Army, has ruled that quinine prophylaxis is to be used only if a man cannot tolerate atebrin. *C. W.*

RENN (Charles E.). **The Crushing Strength of Biological Films on Natural Waters and the Spread of Larvicidal Oils.**—*Jl. National Malaria Soc.* Tallahassee, Fla. 1942. Vol. 1. No. 1. pp. 45–55. With 2 figs.

When natural waters are undisturbed by wind or rain thin membranes form over the surface. These consist mainly of bacteria, protozoa, algae,

pollen, dusts, and microscopic débris imbedded in a tough, inelastic bacterial slime. If there is a light wind they become concentrated at the leeward margins of the pools. These films have a certain rigidity and so reduce the surface tension of the water and resist the spread of oils on the water surface. The degree of resistance offered by the films (that is, their crushing strength) has been determined by noting their ability to block the spread of oils of known spreading pressure. The values are often greater than the spreading pressures of larvicidal oils, particularly at the leeward side of pools, and hence no spreading occurs. When this is so the film must first be broken by agitating the water. It is readily destroyed by strong winds, and rain, or even by heavy mists. *V. B. Wigglesworth.*

BISHOP (Ann). **Variation in Gametocyte Production in a Strain of** *Plasmodium relictum* **in Canaries.**—*Parasitology.* 1943. Feb. Vol. 35. Nos. 1 & 2. pp. 82–87. With 2 figs.

Over a period of two years, during which a strain of *Plasmodium relictum* was being maintained in canaries by blood inoculations, observations were carried out on the number of gametocytes produced. It was noted that the number of gametocytes not only varied from bird to bird but that there was a considerable difference in the number produced in birds inoculated from a single bird. Thus in two old birds and two young birds of the same age inoculated with blood from a heavily infected bird the ratios of gametocytes to red blood corpuscles were 1 : 809, 1 : 385, 1 : 235 and 1 : 6410. Furthermore, in this series there was no correlation between the number of parasites in the blood and the gametocytes, the parasites per 1,000 red blood corpuscles in the four birds being 103, 144, 212 and 50. Similar variations occurred in all the birds observed during the two years. It was noted that after the peak of the infection in any individual bird was passed and the infection began to subside there was a fall in both asexual forms and gametocytes, a fact which indicated that gametocyte production was not in response to the development of immunity. Another point of interest was that the number of gametocytes produced was highest during the period of the year April to July or August. Over the whole period there was no evidence that gametocyte production decreased with repeated blood transmissions, as was found to be the case by GAMBRELL in *P. cathemerium* infections [see this *Bulletin*, 1938, Vol. 35, p. 729].

C. M. Wenyon.

HURLBUT (Herbert S.) & HEWITT (Redginal). **The Transmission of** *Plasmodium lophurae*, **an Avian Malaria Parasite, by** *Anopheles quadrimaculatus.*—*Public Health Rep.* 1942. Dec. 11. Vol. 57. No. 50. pp. 1891–1892.

Transmission experiments were positive ; the exogenous cycle of the parasite was completed in about 17 days when the mosquitoes were maintained, after infection, at 74°–80°F. Oöcysts had previously been found in *A. quadrimaculatus*, but transmission had not been effected.

C. W.

TRAGER (W.). **A Strain of the Mosquito** *Aëdes aegypti* **Selected for Susceptibility to the Avian Malaria Parasite** *Plasmodium lophurae.*—*Jl. Parasitology.* 1942. Dec. Vol. 28. No. 6. pp. 457–465. [23 refs.]

i. KNISELY (Melvin H.), STRATMAN-THOMAS (W. K.) & ELIOT (Theodore S.). **Observations on Circulating Blood in the Small Vessels of Internal Organs in Living** *Macacus rhesus* **Infected with Malarial Parasites.** [Abstract of paper presented at the 57th Annual Session of the American Assoc. of Anatomists, 1941.]—*Anatomical Record.* 1941. Mar. Vol. 79. No. 3. Suppl. p. 90.

ii. —— & BLOCH (Edward H.). **Microscopic Observations of Intravascular Agglutination of Red Cells and Consequent Sludging of the Blood in Human Diseases.** [Abstract of paper presented at the 58th Annual Session of the American Assoc. of Anatomists, 1942.] —*Ibid.* 1942. Mar. Vol. 82. No. 3. p. 426.

i. The authors have studied, by means of quartz rod transillumination, blood vessels of monkeys infected with *P. knowlesi*, and of normal animals. In normal animals blood flow is smooth, and the red cells are not phagocyted in the vessels of the spleen or liver. In malaria a layer of fibrin or fibrin-like substance is deposited on the parasitized red cells, and these cells stick to each other, but not to normal endothelium. Clumps are formed which stick to, and are engulfed by, hepatic and other phagocytes. Plasma viscosity increases and clumps coalesce, reducing capillary flow ; later the endothelium becomes sticky and leucocytes adhere to it. " Terminal symptoms are manifestations of damage resulting from greatly slowed capillary circulation rates."

ii. Similar appearances have been seen in man in infections with *P. vivax, P. malariae,* and *P. falciparum* and in a large number of very diverse diseases. From the presence of clumps and from increased viscosity (sludged blood) arise anaemia, plasma leakage, oedema, haemoconcentration and tissue anoxia. *C. W.*

BLACKWATER FEVER.

MAEGRAITH (B. G.), FINDLAY (G. M.) & MARTIN (N. H.). **Lytic Agent and Inhibitory Factors in Human Tissue and Sera. Changes in Serum Inhibitor Factor in Blackwater Fever.**—*Lancet.* 1943. May 8. pp. 573–575.

Normal human serum in concentrations of 1 : 320 or less inhibits the haemolysis produced when suspensions of erythrocytes are incubated at 37°C. in the presence of washed unheated tissues ; pieces of lung, spleen or liver of man, guineapig or monkey with their homologous erythrocytes were used in the haemolytic systems. (The heterolysin of human serum for guineapig erythrocytes is manifest only when the serum is in high concentration and did not interfere with the observation of the inhibitory effect of the lower concentrations.) Sera taken from patients during haemolytic crises of blackwater fever and from one during an acute attack of malaria, when compared with sera from normal persons, showed a reduction of their power of inhibiting haemolysis.

The authors suggest therefrom that one of the factors involved in the development of blackwater fever is a reduction in the activity of the circulating inhibitor, resulting in excessive uninhibited activity of a normal lytic process, and that in blackwater fever there is no abnormal lysin. They speculate that malaria, quinine or severe muscular exercise may bring about a reduction of the inhibitor or that in blackwater fever there may be some factor which inhibits the inhibitor. They also suggest that a similar imbalance may be concerned in march haemoglobinuria, in the Marchiafava-Micheli syndrome and in haemolysis due to chemical agents such as arseniuretted hydrogen. [In the Marchiafava-Micheli syndrome abnormalities of the erythrocytes are demonstrable; they haemolyse in the presence of normal human serum both *in vivo* and *in vitro*, and experiments suggest that there is no lack of an anti-haemolytic factor.] No reduction of inhibitor was found in serum taken from a patient during a haemolytic crisis of sickle cell anaemia. [See also this *Bulletin*, 1943, Vol. 40, p. 440.] *F. Murgatroyd.*

FREWEN (W. K.). **Blackwater Fever.**—*Jl. Roy. Army Med. Corps.* 1943. Mar., Vol. 80. No. 3. pp. 159–161.

Two cases of blackwater fever are described. The first occurred on the fifth day of quinine therapy in a patient who had just previously been found to have B.T. parasites, although at the time of treatment the only positive finding was an enlarged spleen; it was the patient's first clinical attack of malaria. Treatment of the blackwater fever comprised the application of hot turpentine stupes to the loins, morphia to allay anxiety, alkalis by mouth and glucose-salines and citrated blood intravenously. In 30 hours the urine was free from haemoglobin and three days later a course of atebrin and plasmoquine was given. Recovery was uninterrupted. The second patient had had two previous attacks of malaria. He had a palpable spleen but was apyrexial when he commenced a course of quinine; on the third day of treatment he developed blackwater fever, which was treated similarly to that of the first patient. The urine became free from haemoglobin in 48 hours and atebrin and plasmoquine were then given. Although the general condition of the patient improved the temperature did not respond; it was then found by blood culture that there was a *Bact. paratyphosum A* infection, which progressed normally. *F. Murgatroyd.*

CUST (Austin D.). **The Place of Quinine in the Treatment of Sub-Tertian Malaria.**—*Med. Jl. Australia.* 1943. Feb. 6. 30th Year. Vol. 1. No. 6. pp. 119–120.

Details are given of five cases of blackwater fever occurring in the Gold Coast among Europeans, Syrians and Africans during treatment of malignant tertian malaria with quinine. All the patients had neglected anti-malarial precautions and had taken suppressive quinine only irregularly. The author believes that atebrin is less likely to precipitate haemolysis than is quinine. *F. Murgatroyd.*

TRYPANOSOMIASIS.

VAUCEL. La maladie du sommeil au Cameroun. [**Sleeping Sickness in the Cameroons.**]—*Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1942. July. Vol. 1. No. 1. pp. 100–112; & Oct. No. 2. pp. 88–110. [21 refs.]

Sleeping sickness in the Cameroons was discovered in 1899 and during the next twelve years cases were found in widely separated parts of the territory. The cession of adjoining French territory to Germany in 1911 added further infected areas. Although a sleeping sickness camp was formed in 1910 an intensive campaign was not started until 1913 when four medical posts and three sleeping sickness camps were established in the region of the Nyong river, with a staff of six doctors and nine male and two female trained assistants. They adopted the following measures: (1) closure of declared infected areas with strict control of the movements of the population; (2) medical treatment by atoxyl injections which, in highly infected areas, were given to the whole population; (3) bush-clearing, cultivation, and trapping and catching of tsetse flies; (4) administrative measures including exemption of tax, restriction of labour, road development, and resettlement of population. This campaign was stopped by the war of 1914.

In 1920 a special Service was organized with a staff of two doctors and eleven native assistants whose work was confined to diagnostic surveys and treatment within a limited area. In 1921, after twenty months, 70,000 people had been examined out of a population of 128,000 and 8,548 infected persons were diagnosed. In March 1922, Dr. JAMOT became director of the campaign, and emphasized above all other measures the importance of diagnostic survey and the reduction of the human reservoir of trypanosomes. For this reason he strongly opposed the practice of lumbar puncture which, in French Equatorial Africa, was then considered necessary for a decision as to the form of medical treatment. He relied on atoxyl injections, given as frequently as possible, but occasionally ordered treatment with tryparsamide in order to reduce a high mortality in certain places where atoxyl was unsuccessful. The latter drug was then reserved for prophylaxis in these places. In 1932, when the position was completely under control, LEDENTU succeeded Jamot and introduced lumbar puncture and a more individual form of medical treatment.

In 1926 the prophylactic Mission was created with a staff of 11 doctors, 20 sanitary assistants and 150 native dressers, and this was increased later to 18 doctors, 36 sanitary assistants and 400 native dressers. In 1931 it was converted into an autonomous service and was incorporated in the following year into the Native Medical Services.

Distribution of the disease.

1. *From* 1922 *to* 1926.—The Nyong river flowed through an epidemic centre of great severity. In 46 villages with a total population of 20,351 there were 14,374 infected persons among 17,797 examined; in 59 areas in this region there were 40 per cent. or more infected; in 36 areas there were over 60 per cent., and in 11 areas the proportion varied from 80 to 90 per cent. In a total population of 125,535 there were 33,537 (29·7 per cent.) infected out of 112,945 examined. The infection spread in all directions from the Nyong river area far beyond

the limits of the first sector. By the 1st July, 1926, 64,012 infected persons had been discovered.

2. *From* 1926 *to* 1929.—The second stage began with the formation of the prophylactic Mission and another two years were needed to define the limits of the disease. At the end of 1928 an almost complete chart of sleeping sickness in the Cameroons had been prepared.

At the end of 1920 Jamot divided the infected regions into: A. Epidemic zones, with over 15 per cent. of the population infected, and comprising three centres. Among 194,889 persons examined, 82,583 (43·2 per cent.) were infected. B. Endemo-epidemic zones situated between and around the epidemic zones and with about 15 per cent. infected. These comprised five centres; 23,319 infected persons (14·5 per cent.) were found among 160,306 examined. C. Endemic zones and transitional zones between infected and healthy regions. Out of 287,257 persons examined there were 6,893 (2·4 per cent.) infected.

Altogether of a total population of 752,520 there were 669,971 (88 per cent.) examined; of these, 115,354 (17·2 per cent.) were found infected.

Mortality.—Before the establishment of the prophylactic Mission 64,012 cases had been diagnosed and of these 21,673 (34 per cent.) had died between 1920 and July 1926. Further figures have shown that the annual mortality varied from 5 to 15 per cent. in different foci; among untreated cases Jamot concluded that it varied from 25 to 50 per cent.

Results.—On the whole the result of the action taken, which was almost entirely restricted to treatment of the infected, was an immediate decrease in the number of new cases and in the parasite and mortality rates. Figures are given of the effect in various areas. In certain epidemic regions the parasite index fell rapidly to very low figures, *e.g.*, from 52 per cent. to 1·79 per cent. in one year, from about 80 per cent. to about 5 per cent. within a few years, and, finally, to about 2 per cent.; and in another area from 80 per cent. in 1923 to 23·5 per cent. in 1928 and 0·71 per cent. in 1938.

The incidence of new infections and the mortality rates also diminished greatly; in some cases this was thought to be due to the use of tryparsamide. The author finds it difficult to attribute the success entirely to chemotherapy. Some tribes have been freed from trypanosomes by injections of atoxyl; others seem to have been saved from total destruction by tryparsamide. But atoxyl is followed by about ten per cent. of parasitic relapses and has no action on meningeal lesions, and though tryparsamide may have reduced the mortality, it is harder to understand the rapid decrease in the new cases since its trypanocidal action is weak. In other places similar medicinal treatment encountered resistance, checks and revivals of infection which are inexplicable. A certain impression, however, emerges: marked success in the spreading zones; resistance and checks in old endemic foci situated in swampy riverine areas infested with tsetse.

The position in 1939 was as follows: most of the old foci were extinct or under control with parasite indices of about one per cent. or less. On the other hand the incidence of new cases had arisen during the last two years in certain western regions. It is easy to see that there has been little further change since the striking success of the campaign of 1927–1928 which reduced the number of new cases from 54,712 to 6,000 in 1929. During the last ten years the incidence of

new cases has remained about the same and seems to have reached a threshold impossible to cross. Here and there, every year, small foci appear and the reason is difficult to understand. Drug resistance can have little influence since most of the patients are treated far from their villages. Chemotherapy, enriched during recent years by new products, cures most of the cases but cannot eradicate trypanosomiasis. The disease no longer affects the figures of population and hardly interferes with economic activity, but these results are only maintained by continuous vigilance. Something more is required. In addition to advising stronger administrative measures the author discusses the question of breaking contact between man and fly by settlements of people and destruction of tsetse. He mentions the theory of the possible existence of specially receptive and infective races of tsetse and perhaps also of specially virulent trypanosomes in endemic areas. Migrations of such flies from time to time might cause brief epidemics, soon subsiding owing to the unfavourable environment for the fly.

The purely medical efforts will only be completed by the agricultural, economic and social development of the country. *J. F. Corson.*

MALBRANT (R.). Gibier, tsé-tsés et trypanosomiases. **[Game, Tsetse Flies and Trypanosomiasis.]**—*Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1942. Oct. Vol. 1. No. 2. pp. 73–87.

This appears to be a discussion very much on the lines of that abstracted in this *Bulletin*, 1942, Vol. 39, p. 242.

CHORLEY (J. K.). **Tsetse Fly Operations, 1941. Short Survey of the Operations by Districts for the Year ending December, 1941.**—*Rhodesia Agric. Jl.* 1942. Vol. 39. pp. 231–235. [Summary taken from *Vet. Bull.* 1943. May. Vol. 13. No. 5. p. 173. Signed U. F. RICHARDSON.]

During 1940 the zones covered by anti-tsetse operations in Rhodesia were pushed forward to give additional protection to the ground already recovered from tsetse, estimated at over 6,000 sq. miles, and 1941 was devoted mainly to consolidation of the newly occupied advanced positions. Native cattle have continued to increase in all areas previously cleared of tsetse, and in some cases the demand for new grazing has resulted in native cattle being pushed forward into areas of retreating fly with embarrassing precipitancy. A large scheme of native settlement in the Urungwe Native Reserve was to be carried out in 1942, and also a scheme for post-war European settlement is being planned for this area, and here a considerable increase has been made in the number of native hunters. Two new roads have been cut, dips sited, medical centres provided, and schemes of soil and water conservation prepared.

Over 20,000 game animals have been destroyed during the year. The position in restocked areas appears to be satisfactory, but there has been an extension of *G. morsitans* toward the Rhodesian border from Portuguese territory, and in the Melsetter area there have been suspected outbreaks of trypanosomiasis on 33 farms.

By the courtesy of the Portuguese authorities a rapid survey of conditions in the neighbouring Portuguese territories has been made by Rhodesian and South African officials.

GILBERT (F. W.). **Preliminary Report on Pentamidine in the Treatment of Late Cases of Sleeping Sickness.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1943. May. Vol. 36. No. 6. pp. 353–358.

Brief notes are given of the treatment of 14 cases of human trypanosomiasis (*Trypanosoma gambiense*) in Northern Rhodesia near Lake Tanganyika. Ten of the cases were in patients who had received treatment with other drugs a year or more previously and one of the four new patients had a history of drowsiness for about one year before admission.

Pentamidine was given by a daily injection for eight days, either intramuscularly or intravenously. It was first tried by the intramuscular route in amounts varying from 1·6 to 5·15 mgm. per kgm. of body weight, which represented doses of one or two grains, in one case three grains. No reaction or discomfort was caused. Intravenously a dose of more than 2·0 mgm. per kgm. produced headache and severe rigors.

The observation period varied from a few weeks to a few months and immediate results were judged by examination of the cerebrospinal fluid obtained by lumbar puncture.

The author concludes that pentamidine certainly reduces the cell-count of the cerebrospinal fluid in late cases; in cases which are not very advanced the clinical state shows real improvement, but he considers that a follow-up period of at least two years is necessary to establish its real value. In two cases tryparsamide produced rapid clinical improvement after pentamidine had failed. The author suggests that at least 2·0 mgm. per kgm. of body weight should be given, preferably intravenously, and two courses of eight injections, with a week's interval, might be highly effective except in cases verging on coma. [See also this *Bulletin*, 1942, Vol. 39, p. 532; 1943, Vol. 40, p. 370.] *J. F. Corson.*

ROSENTHAL (Sanford M.). **The Trypanocidal Action of 3-Amino-4-Hydroxyphenyl Arsenious Oxide ("Mapharsen") administered Orally with Glutathione.**—*Jl. Pharm. & Experim. Therap.* 1942. Dec. Vol. 76. No. 4. pp. 358–362.

As is well known, trivalent arsenobenzols, *e.g.*, neoarsphenamine, are poorly absorbed when given by mouth, possibly owing to their colloidal nature, and little therapeutic effect is produced. The author investigated whether the soluble compound, mapharsen, would be more effective if given in this way; glutathione was given simultaneously, to diminish the toxicity. The experiments were made with mice, infected with *T. equiperdum*. The drug was given by stomach tube on the second day after inoculation with trypanosomes. The maximum tolerated single dose of mapharsen was 0·15 gm. per kgm. (1 mouse out of 10 died), but when the mapharsen was mixed with 5 mol. glutathione the maximum tolerated dose was 1·0 gm. per kgm. The maximum tolerated dose of mapharsen given intravenously is 0·025 gm. per kgm. The curative single dose of mapharsen, given orally, was 0·04 gm. per kgm. and that of mapharsen plus 5 mol. glutathione was about 0·06 gm. per kgm. The curative dose of mapharsen given intravenously was 0·004 gm. per kgm. Thus when mapharsen is given orally with glutathione, the chemotherapeutic index (max. tol. dose/curative dose) is 1·0/0·06=17, as compared with an index of 0·025/0·004=6 when it is given intravenously. In preliminary experiments with

rabbits infected with syphilis, the oral administration of mapharsen caused disappearance of the chancre, but spirochaetes persisted in the inguinal lymph nodes. *F. Hawking.*

DAVIS (Dorland J.), MCGREGOR (Theodore) & DESHAZO (Thelma). *Triatoma sanguisuga* (**LeConte**) **and** *Triatoma ambigua* **Neiva as Natural Carriers of** *Trypanosoma cruzi* **in Texas.**—*Public Health Rep.* 1943. Feb. 26. Vol. 58. No. 9. pp. 353–354.

Hitherto six species of Triatoma in the United States have been found infected naturally with *Trypanosoma cruzi*, namely, *T. protracta*, *T. p. woodi*, *T. uhleri*, *T. gerstaeckeri*, *T. heidemanni*, and *T. longipes*. Nearly 30 years ago BRUMPT showed that *T. sanguisuga* was infectible experimentally, and three years ago PACKCHANIAN showed the same for *T. ambigua*. The authors have recently examined large numbers of Triatoma of various species from different parts of Texas, some from private houses, others from nests of the wood rat, *Neotoma micropus*. Faeces expressed from specimens of *T. sanguisuga* from Matagorda and Dimmit Counties, and *T. ambigua* from Uvalde County, during life, were found to contain crithidia and metacyclic forms, and were proved to be infective to young laboratory-reared desert mice, *Peromyscus eremicus*. Trypanosomes were present in the blood in small numbers in the second week after intraperitoneal inoculation, and after four weeks in large numbers, one or two in each microscopic field, and the heart muscle revealed the characteristic leishmanial forms. These two species must, therefore, now be added to the other six, as naturally infected. *H. Harold Scott.*

LEISHMANIASIS.

COLONIEU (L.). Au sujet du bouton d'Orient en Algérie. [**Oriental Sore in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. Sept. Vol. 19. No. 3. pp. 358–359.

Three cases are reported, one from Gouraya (Department of Algiers), one from the Department of Oran, and one from Algiers itself. The author points out that this affection may be contracted anywhere in Algeria, even in Algiers itself. *C. W.*

PARROT (L.). Notes sur les phlébotomes. XXXV.—Présence de *Phlebotomus perfiliewi* dans la banlieue d'Alger. [**The Presence of** *P. perfiliewi* **in the Outskirts of Algiers.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. Sept. Vol. 19. No. 3. pp. 360–361. [14 refs.]

P. perfiliewi (*P. macedonicus*) has previously been found in the Atlas mountains and other high places of Algeria, but has now been discovered in the outskirts of Algiers, together with *P. sergenti*, *P. perniciosus*, *P. longicuspis*, *P. ariasi* and *P. parroti*. It is also found in the Crimea, Macedonia, Palestine, Crete, Malta, Hungary and Italy, where it is regarded by VANNI [this *Bulletin*, 1940, Vol. 37, pp. 352, 779] as a vector of oriental sore. *C. W.*

FEVERS OF THE TYPHUS GROUP.

GEAR (James). **The Typhus Group of Fevers.**—Reprinted from *Leech.* 1941. Oct. Vol. 12. No. 2. 9 pp.

This is an admirably clear and succinct account of the chief features of the types of typhus fever seen in South Africa. The classification according to the arthropod vectors is regarded as being the most useful in practice. The distribution of louse typhus in South Africa is related to climate, not to the vector, which appears to be just as plentiful in the warmer as in the colder parts of the country. The head louse is considered to be an effective vector. The balance of evidence is opposed to the view that epidemics can originate from the murine type of Rickettsia because this retains its characteristic features in spite of all efforts to transform it to the human type.

Clinical diagnosis is not easy in dark-skinned persons, in whom the rash is difficult to detect.

In tick-bite fever, the South African variety of tick typhus, the primary sore and regional lymphadenitis are often absent, especially in severe cases. The animal hosts have not been detected but probably are rodents of the veld: the striped mouse and the gerbille are suspected. The dog is believed to be a conveyer of infected ticks rather than a reservoir of infection. In most cases infection is conveyed by larval ticks, which are so small as to escape attention; nymphs and adults are usually noticed before becoming attached. The primary sore appears three or four days after the infecting bite, and the fever three or four days later. The rash appears on the third to the fifth day of the fever and is generally more pronounced in severe attacks. In mild cases there may be only a few raised papules; in severe attacks there is a profuse maculo-papular rash and dusky mottling of the skin. The palms, soles and face are involved. The duration of the fever may be one to seven days in mild cases but may be as long as 14 days; the average case lasts 10 days. The fever is usually intermittent. The mortality rate is one or two per cent.

Agglutinins generally appear after the tenth day, *Proteus OX2* is agglutinated on the average to the same titre as *Pr. OX19*; *Pr. OXK* is often agglutinated, but only at a low titre. Cases of fever with agglutination of *Pr. OX2* only are almost certainly tick-bite fever. The average titres of agglutination are relatively low, but in some cases the reaction does not differentiate tick-bite fever from louse typhus or flea typhus.

[The table is on the lines already adopted by the reviewer, but it contains additional useful information and so is reproduced.

It will be seen that the louse-borne and flea-borne typhus fevers of South Africa are shown as having the same serological and other characters as the typhus fevers transmitted by corresponding vectors in other parts of the world, so that the author does not subscribe to the view that these South African fevers belong to different antigenic groups from louse typhus and flea typhus occurring elsewhere.

Since this table was prepared CASTAÑEDA has shown that there is a pronounced degree of cross immunity between the Rocky Mountain variety of tick typhus and both murine and classical typhus.

Brill's disease could properly be included as a form of louse typhus. Tabardillo is mentioned as a synonym of flea typhus, but the name cannot be regarded as applying only to the flea-borne disease, it has

	Epidemic	Non-Epidemic		
	Louse Typhus. Epidemic or classical typhus; typhus exanthematicus.	Flea Typhus. Murine typhus; shop typhus; tabardillo; fièvre nautique.	Tick Typhus. Rocky Mountain spotted fever; fièvre boutonneuse; Indian tick typhus; tick-bite fever.	Mite Typhus. Tsutsugamushi fever; Japanese river fever; scrub typhus of Malaya; scrub typhus of Australia.
Epidemiology ...	Spread favoured by filth, famine and overcrowding.	Spread favoured by close contact with rats.	Diseases of rural or suburban areas; spread not favoured by urban conditions.	Diseases of plantations and estates.
Distribution	World wide; apparently rare in tropics.	World wide; commonest in tropics and subtropics.	Common in tropics and subtropics. Africa, America, Europe, Asia.	Tropics and subtropics of the East.
Virus	*Rickettsia prowazeki.*	*Rickettsia mooseri.*	*Rickettsia rickettsi*; *Rickettsia conori.*	*Rickettsia orientalis.*
Vectors	Human lice: *Pediculus humanus*	Fleas, especially *Xenopsylla cheopis.*	Various species of *Ixodidae.*	Mites: *Trombicula.*
Reservoir of infection	Man.	Rats and mice.	Rodents of the wilds; possibly dogs.	Rats and mice.
Primary sore with regional lymphadenitis	Absent.	Absent.	Often present.	Often present.
Rash	Fine papular and macular and petechial.	Fine papular and macular, not prominent.	Coarse papular and macular and petechial.	Maculopapular.
Mortality	5–50 per cent.	± 4 per cent.	1–75 per cent. 1–2 per cent. in tick-bite fever.	1–60 per cent.
Serum reactions:				
Proteus X19 ...	+++	+++	++	—
Proteus X2 ...	+	±	++	—
Proteus XK ...	±	—	+	+++
Cross immunity:				
Immunizes against:				
Louse typhus ...	+	+	—	—
Flea typhus ...	+	+	—	—
Tick typhus ...	—	—	+	?
Mite typhus ...	?	?	?	?
Scrotal reactions in guineapigs	Rare but mild.	Severe and constant.	Severe or moderate and regular.	?
Cytoplasmic distribution of Rickettsiae in peritoneal exudate	Closely packed aggregations in cytoplasm of serosal cells.	Closely packed aggregations in cytoplasm of serosal cells.	Scattered in cytoplasm of mononuclear cells.	Scattered in cytoplasm of mononuclear cells.
Cytoplasmic distribution of Rickettsiae, in chick chorio-allantoic membrane	Aggregations. No intranuclear infection.	Aggregations. No intranuclear infection.	Scattered. Intranuclear infections present.	?

been widely used of the fevers of the typhus group occurring in Mexico and in many cases the vector is uncertain.

In the table the query mark in connexion with cross immunity between mite typhus and mite typhus is probably a slip. LEWTHWAITE and SAVOOR have shown [this *Bulletin*, 1940, Vol. 37, pp. 576, 847] that the two chief types of mite typhus immunize against each other and are probably identical.] *John W. D. Megaw.*

MACCHIAVELLO (Atilio) & CIFUENTES (Osvaldo). El tifo exantemático en Chile. [**Exanthematic Typhus in Chile.**]—*Rev. Chilena de Hig. y Med. Preventiva.* 1942. Sept. Vol. 5. No. 2. pp. 109–129. [Bibliography.]

Under the name "exanthematic typhus" the authors include louse-borne and flea-borne typhus, the two fevers of the typhus group known to occur in Chile.

Epidemics of louse-borne typhus have occurred in Chile at intervals ever since the middle of the sixteenth century. The recent epidemic periods were, 1918 to 1925 and 1932 to 1939. From 1918 to 1939 more than 87,000 cases and about 18,500 deaths have been officially notified.

Flea-borne typhus was first recognized as occurring in Chile in 1932, but it seems to be relatively unimportant and Macchiavello does not believe that it constitutes a reservoir of infection of the louse-borne disease. The review and the bibliography of nearly 80 articles show that Chilean medical men have studied every aspect of louse-borne typhus; the senior author, Macchiavello, has made 19 contributions to the literature of the typhus group.

Mention is made of the unfortunate episode of 1935 when 227 attacks of murine typhus, with five deaths, occurred in a group of 550 persons after inoculation with Blanc's vaccine. The lack of enthusiasm for protective inoculation on the part of the people of Chile is said to be due to this event.

[The article is of great interest but it cannot well be summarized; most of the work that is dealt with has already been reviewed in this *Bulletin*.] *John W. D. Megaw.*

FINDLAY (G. M.), REID (R. D.) & MAEGRAITH (B. G.). **Typhus in the Gold Coast.**—*Jl. Roy. Army Med. Corps.* 1943. Mar. Vol. 80. No. 3. pp. 134–141. With 1 chart. [10 refs.]

A case of fever with symptoms which were regarded as suggestive of murine typhus was investigated in Accra, Gold Coast, in June 1942. The illness began with tenderness and slight enlargement of a lymph node in the right axilla; there was no definite scar but a red patch about 2 cm. in diameter was found on the back of the right shoulder. On the second day the temperature rose to 101°F. and there was pain in a femoral lymph node. From the chart it is seen that the fever was irregularly remittent from the 2nd to the 8th day, the temperature on most days rising once, or more often twice, daily to about 103°F. and falling on five of these days to a minimum of between 99° and 100°F. Early on the 9th day there was a sudden fall from 103° to normal, and during the next three days the fever was irregularly intermittent, never rising above 101°.

There was a papulo-erythematous rash which appeared on the 4th day and was still faintly visible after a hot bath till the 3rd or 4th week of convalescence. The rash was more prominent on the trunk than on the limbs.

The Weil-Felix reaction was negative on the 5th day, but on the 17th day the titre to *Proteus OX19* was 1–100, and to *Pr. OX2* it was 1–250. Two guineapigs inoculated with serum taken on the 6th day had no obvious reaction, and two inoculated with ground-up blood clot had had no reaction by the 8th day, when one of them was killed; the other had a febrile reaction on the 11th day and was killed two days later to provide material for sub-inoculation into two other guineapigs which reacted with fever on the 5th and 6th days. No scrotal reaction had yet been observed but two animals of the 3rd passage had typical scrotal reactions and Rickettsiae were found in the haemorrhagic tunica. After six passages the incubation period in the guineapigs gradually became longer and by the 10th passage the infection had apparently died out.

Similar types of Rickettsiae were isolated from some of the black rats (*Rattus rattus*) of the immediate neighbourhood and from the giant rat, *Cricetomys gambianus*. With these strains also scrotal reactions did not appear till the 3rd guineapig passage at earliest. Specimens of *Xenopsylla cheopis* collected from giant rats were triturated and inoculated into guineapigs which gave febrile reactions with incubation periods of five to six days. The black-rat strain gave cross immunity with both the human and the giant-rat strains.

The probable source of infection was a black rat and the vector the rat flea, *X. cheopis*. Ticks were taken into consideration because the patient had been in the habit of removing them from a cat. Blood from the cat and suspensions of the ticks found on it caused no reaction in guineapigs. It was thought possible that the cat might have harboured rat fleas or cat fleas, which are possible vectors.

The Rickettsiae approximated to the murine type but there are doubts whether the responses in experimental animals are decisive criteria on which to base a classification of these organisms.

[This case is a further example of the difficulties so often encountered in the differential diagnosis between the fevers of the typhus group. The investigation in this case was much more thorough than is usually practicable: in ordinary conditions the guineapig reaction would probably have been regarded as negative, and no further investigation would have been considered necessary.] *John W. D. Megaw.*

MOUSTARDIER (G.). Sur un cas de fièvre typho-exanthématique observé en A. E. F. [**A Case of Exanthematic Typhus observed in French Equatorial Africa.**]—*Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1942. Oct. Vol. 1. No. 2. pp. 21–28.

This case is described as one of typical typhus fever in a European patient living in Brazzaville, in French Equatorial Africa, where fevers of the typhus group are said to be fairly common.

The onset was sudden, the temperature ranged between 37·6° and 39·0°C. for the first four days; then for four days the fever was of the high, continued type. The temperature began to fall by lysis about the eighth day and reached normal on the 15th day.

A rash appeared on the eighth day, first on the front of the chest and abdomen, then all over the body, including the palms of the hands, but not extending to the face. The rash was of the discrete maculo-papular type. The Weil-Felix reaction was positive to *Proteus OX19*, 1–3,500 and to *Pr. OXL*, 1–50, but was negative to *Pr. OX2* and *Pr. OXK*; all on the 19th day.

This reaction and the absence of a *tache noire* were opposed to the diagnosis of boutonneuse fever. A tick-infested dog occupied the same room as the patient, but suspensions of the ticks caused no reaction in a guineapig inoculated intraperitoneally. The quarters were infested with rats, but none of these could be captured.

The infection was regarded as murine and was suspected of having been acquired by the ingestion of food or drink contaminated by the dejecta of rats.

The author has also observed several cases of an "eruptive fever" among Europeans in Brazzaville; nearly all in the rainy season from February to June. A maculo-papular rash appeared on the fourth day, first on the forehead and then on the body and limbs. In all the typical cases a small black necrotic patch was seen on a lower extremity; sometimes, but not always, associated with enlargement of the corresponding lymph nodes. The fever lasted 12 to 14 days and ended by lysis. All the patients seem to have kept tick-infested dogs, but attempts to recover Rickettsiae from the ticks were unsuccessful, and the agglutination reaction to *Pr. OX19, OXK, OXL*, and *OX2* was always negative.

The diagnosis was, therefore, uncertain, but the disease may have been either the "tick-borne pseudo-typhus of SANT' ANNA and NUTTALL" or boutonneuse fever. *John W. D. Megaw.*

LAMPERT (H.). Die Bewertung des weissen Blutbildes bei Fleckfieberkranken. [**The Significance of the Leucocyte Picture in Typhus Fever.**]—*Deut. Med. Woch.* 1943. Jan. 8. Vol. 69. No. 1. pp. 12–15. With 3 figs.

During the present war the author has observed 300 cases of typhus fever. In six severe cases, three of which were fatal, he has made detailed observations of the leucocytes from day to day. The findings in the three cases with recovery are illustrated by elaborate graphs.

The general trend in these cases was towards a pronounced increase in the total and differential polymorphonuclear count during the fever with a fall to normal in convalescence; the lymphocyte count was relatively low during the first few days, but rose temporarily towards the end of the fever. The lowest total leucocyte count observed was 7,200 (on the 13th day) and the highest 26,100 (on the 12th day), in a different case.

During the first few days there was a pronounced shift to the left in the Arneth-Schilling index, and on the strength of his observations the author concluded that when at this stage the percentage of the polymorphonuclears with rod-shaped ("stabkernige") nuclei was 15 to 25 there was a strong suspicion of typhus; when it was 25 to 40 an absolute diagnosis of the disease could be made in severe cases of fever.

The index does not help in prognosis, it tends to return towards normal before death as well as in convalescence; it is regarded as showing the strength of the defensive reaction rather than of the intoxication.

[The paper will be of interest chiefly to specialists in haematology, who must judge for themselves whether the leucocyte picture has the diagnostic significance attributed to it by the author.]

John W. D. Megaw.

GOETERS (W.). Serologische und tierexperimentelle Beobachtungen bei Fleckfieber. [**Observations on Serological and Animal Experimental Tests for Typhus Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1942. Nov. 12. Vol. 102. No. 4. pp. 299–312. With 2 figs.

The author begins by making the claim that hygienic measures and timely inoculation by Weigl's vaccine have kept the number of cases of typhus fever at a surprisingly low level during the present war. The announcements of actual figures is forbidden so that in this paper percentages are given.

The effectiveness of the vaccine is shown by the small percentage of attacks (6 per cent.) in vaccinated persons exposed to great risk, and by the mildness of the attacks that did occur.

Weil-Felix reactions were carried out in a number of persons for three months after inoculation: in about two-thirds the reaction was negative throughout the period; in the rest weak positives were first observed after two weeks, titres of 1–100 were reached after four or five weeks, and titres of 1–200 or over, after twelve weeks. No titres in excess of 1–400 were seen. There was no association between the strength of the reaction and the degree of protection afforded by the vaccine.

The following figures show the times of first appearance of the Weil-Felix reaction in a number of cases of typhus fever: 4th day, in 4·9 per cent.; 5th day, in 8·2 per cent.; 6th day, in 12·2 per cent.; 7th day, in 59·8 per cent.; 9th day, in 8·4 per cent.; 11th day in 1·7 per cent.; and 13th day, in 2·3 per cent.

In a large number of patients suffering from fevers other than typhus the Weil-Felix reactions gave the following results:—84·4 per cent. were negative; 11 per cent. were positive 1–50; 0·9 per cent. were ±1–100; 2·7 per cent. were positive 1–100; and 0·5 per cent. were positive at higher titres, including two patients who reacted at 1–400. From one of the patients who reacted at the highest titre a strain of Proteus was cultivated from the urine, but the serum of the patient did not react to his own strain.

In undoubted cases of typhus in persons who had received T.A.B. inoculation the following other reactions were found:—to *Bact. typhosum* in 25·5 per cent. at titres of 1–100 to 1–200, and in 7·6 per cent. at titres of 1–400 to 1–800; to *Bact. paratyphosum A* in 13·9 per cent. at titres ranging from 1–100 to 1–400; and to *Bact. paratyphosum B* in 12·3 per cent. in the same range of titres. *Bact. enteritidis* (Breslau or Gärtner strains) were agglutinated at titres of 1–100 to 1–400, in 14·1 per cent. and dysentery bacilli, mostly Flexner Y, at 1–50 in 2·5 per cent. of the cases.

The "dry blood agglutination test" of Kudicke and Steuer is highly praised as a rapid preliminary test and as an easy method of making surveys of suspected communities, but it is not regarded as supplanting the standard reaction. For the dry blood test suspensions of *Proteus OX19* in normal saline, killed at 75°C., and preserved by the addition of alcohol to make a strength of 25 per cent., can be used; these keep

for several months. Dried cultures which are suspended in saline just before use are also satisfactory, but suspensions of living cultures or of cultures to which formol has been added are not recommended.

The only animal experiments that are mentioned are intraperitoneal inoculations of 0·5 to 2·0 cc. of freshly drawn and defibrinated blood of the patients. In 10 guineapigs inoculated with blood taken between the fourth and the eighth days the average incubation period was 8·9 days, and the febrile period eight days. In six guineapigs inoculated with blood taken between the 11th and the 13th days the average incubation period was 14 days, and the febrile attack 13·5 days.

Special attention is called to the great frequency of mild and larval attacks in communities living in areas where the disease is persistently endemic. In such communities typhus fever is a common disease of childhood, like measles or scarlatina, and it follows that many of the inhabitants of the places concerned have some degree of immunity against the disease. *John W. D. Megaw.*

DING (Erwin). Zur serologischen und Mikrobiologischen Diagnostik des Fleckfiebers. [**The Diagnosis of Typhus Fever by Serological and Microbiological Methods.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1942. Dec. 31. Vol. 124. No. 5. pp. 546–553. [12 refs.]

Repeated agglutination and other tests in 53 undoubted cases of typhus fever, of which nine were fatal, gave the following results :—In eight cases the Weil-Felix reaction was completely negative and in nine other cases it was positive in dilutions not exceeding 1–100. Positive reactions to *Bact. paratyphosum B* were observed in 29 of the cases, and in 14 of these the reaction was positive also to *Bact. typhosum*, none of these reactions could be explained on the grounds of mixed infection, inoculation or previous attacks. Attempts were made to cultivate *Proteus X19* from the cerebrospinal fluid of typhus patients but negative results were obtained in 176 tests.

Some of the findings in the elaborate investigations were as follows :—In 127 tests, the pressure of the cerebrospinal fluid was within normal limits in 63, low in 60, and high in 4 ; it tended to fall during the attack. The cell count was normal in every case.

In 10 of the 53 cases the cerebrospinal fluid as well as the serum yielded positive Weil-Felix reactions, but there was no relationship between these positives and the severity of the attacks.

Three of the cases in which the Weil-Felix reaction was negative are reported in detail : two of these patients died and the diagnosis was confirmed at the autopsy. Four of the patients in whom the reaction was in titres below 1–100 died. Factors of place and time may be of importance in connexion with these results ; in one group of 38 patients there were only six negative or weak reactions, one of which was in a fatal case, whereas in another group of 15 patients there were 12 such reactions, four in fatal cases. The anomalous reactions were much more frequent in severe attacks.

The various types of agglutination responses are shown in the table.

The reactions to *Bact. typhosum* and *Bact. paratyphosum B* were usually in titres of ± 1–100 but sometimes rose to ± 1–400 : there was no correlation with the severity of the attack.

In the course of 413 agglutination tests flocculation of the serum when mixed with normal saline was seen on 29 occasions, usually in

Number of cases	*Proteus OX19* (1–25 and over)		*Typhoid group.*	
	Blood	Cerebrospinal fluid	Blood	Cerebrospinal fluid
13	+	—	—	—
13	+	—	+	—
9	+	—	+	+
7	—	—	—	—
7	+	+	+	+
2	+	+	—	—
1	+	+	+	—
1	—	—	+	—
Total 53 (9 fatal)	45	10	31	16

cases in which high-titre Weil-Felix reactions occurred just before or just after the anomalous finding.

Complement-fixation reactions for syphilis were positive in 20 cases in the blood serum and in nine cases in the cerebrospinal fluid. The Kahn test was positive 14 times in the blood and 4 times in the cerebrospinal fluid; these reactions were not related to the Weil-Felix response or to the severity of the disease.

[The author does not refer to the possibility that he was dealing with a strain of *Proteus OX19* of low agglutinating power. Such a large percentage of negative and low-titre responses is so extraordinary that most workers will suspect the existence of a fallacy somewhere.]

John W. D. Megaw.

GAUD (Jean). Comparaison des résultats de la micro-réaction de Castañeda et Silva modifiée par L. Ch. Brumpt et de la réaction classique de Weil et Félix dans le diagnostic du typhus exanthématique. [**The Results of the Micro-Reaction of Castañeda and Silva as modified by L. Ch. Brumpt as compared with those of the Classic Weil-Felix Reaction.**]—*Bull. Inst. Hyg. Maroc.* 1941. N.S. Vol. 1. pp. 35–44. With 4 graphs.

This paper is of considerable importance as showing the degree of reliance that can be placed on one of the best known of the rapid bedside tests for typhus fever. The method consists in mixing on a glass slide a drop of finger blood with a drop of a suspension of *Proteus OX19* stained with methylene blue and sterilized by formol. The mixture is spread [presumably so as to form a shallow pool] and is kept moving by tilting the slide with a circular movement. In positive reactions the mixture, instead of remaining of a uniform greenish-brown colour, becomes surrounded by a blue ring made up of the agglutinated stained bacilli. In most cases the reaction appears within

one or two minutes, the latest reading is made at the end of four minutes. The suspension keeps well. The author uses a stock suspension which, when diluted 20 times for the actual test, gives a reading on the Vernes opacity scale of 50 to 60.

Of 200 "healthy" blood samples two were positive to each of the two tests. The results in a large number of known and suspected cases of louse-borne typhus fever are given in detail in tables from which the following summary has been compiled:—

	Total number of positive Weil-Felix reactions	Number of these negative to the micro-reaction
Weil-Felix titre:		
1–50 and 1–100 ...	227	33
1–200 to 1–1,000 and over	1,121	9

	Total number of positive micro-reactions	Number of those negative to the Weil-Felix reaction
Micro-reaction:		
Positive in less than 60 seconds	1,033	1
Positive in 60 to 120 seconds	240	18
Positive in 120 to 240 seconds	73	21

In 140 cases the blood was negative to both reactions and in 1,306 it was positive to both.

Of the 40 cases in which the blood was positive to the micro-reaction and negative to the Weil-Felix 14 could be followed up, and six of these became positive later to the Weil-Felix test while four others were undoubted cases of typhus fever, so that the reliability of the micro-reaction compared favourably with that of the standard test.

There is obviously some degree of correlation between the rapidity of appearance of the micro-reaction and the titre of the Weil-Felix reaction; about three-fourths of the cases in which the former reaction was positive in less than 30 seconds corresponded to a Weil-Felix titre of 1–800 and over, but on the other hand a positive occurring between 30 and 60 seconds was just as likely to correspond to titres of 1–200 or 1–400 as to those of 1–800 or over. Variations in temperature or in the richness of the suspensions did not explain this lack of correlation between the two reactions.

The general standard of agreement between the micro and the standard reactions was over 96 per cent., and if account is taken only of cases in which the Weil-Felix titre was 1–200 or over and of cases in which the micro-reaction was positive within 60 seconds, the agreement is almost complete.

Special advantages of the reaction are its simplicity, rapidity, and freedom from risk to unskilled persons, who can be quickly trained in the technique. The chief source of error is the occasional occurrence of auto-agglutination of the red blood corpuscles, which may give rise

to the formation of a red rather than a blue ring : this occurs chiefly in cold weather and can usually be prevented by warming the slide beforehand. Co-agglutinins to typhoid were found in seven cases, in two of which the patients had received T.A.B. inoculation.

The author concludes that in reliability and sensitiveness the reaction is equal to the classic Weil-Felix reaction. *John W. D. Megaw.*

AHRENS (Walther). Verwendung von Trockenantigen bei der serologischen Schnellmethode zum Fleckfiebernachweis. [**The Use of Dry Antigen in the Rapid Serological Diagnosis of Typhus Fever.**]—*Arch. f. Hyg. u. Bakt.* 1942. Vol. 128. No. 6. pp. 281–283. [10 refs.]

Using STEUER's "dry-blood" agglutination test [this *Bulletin*, 1942, Vol. 39, p. 372] the author has tested the activity of suspensions of *Proteus OX19* made from dried cultures as compared with those made from fresh cultures, and has found that the results were closely comparable.

The growth from 16 to 20-hour cultures on agar plates is collected with a loop and dried at 37°C. for one day and then reduced to a fine powder. A little of this is picked up with the point of a knife and mixed with 10 cc. normal saline. By shaking at intervals for ten minutes a uniform suspension is made and filtered through filter paper. The opacity should correspond with that of suspensions used for the Widal test. Tests were made with 29 sera which had been found to give positive Weil-Felix reactions in titres ranging from 1–50 to 1–1,600 and over. The results are shown in a table in which they are compared with each other and with the standard Weil-Felix reactions. The dry antigen has been kept already for three months without deterioration.

The author points out that the use of dried bacterial cultures for agglutination tests is not a new idea ; in 1922, J. W. WILSON, made a "stable and sensitive" preparation of this kind by drying bacterial cultures *in vacuo*. *John W. D. Megaw.*

SCHÄFER (Walther). Ueber eine Methode zur Schnell-diagnose des Fleckfiebers am Krankenbett. [**A Rapid Method of Bedside Diagnosis of Typhus Fever.**]—*Deut. Med. Woch.* 1943. Jan. 22. Vol. 69. No. 3. pp. 63–64.

This is still another bedside modification of the Weil-Felix test. Dried smears of a suspension of *Proteus X19* are made on glass slides and drops of the serum to be tested are added to these.

A 20-hour agar slope culture is mixed with 2 to 3 cc. of equal parts of 96 per cent. alcohol and normal saline and kept overnight at 37°C.

Two drops of the suspension are placed separately on a glass slide and dried in the incubator. A drop of the serum is added to one of the smears and mixed with it after a minute by rubbing with the corner of a glass slide. In positive cases the clumping is easily seen with the naked eye especially if the slide is held in a good light against a dark background.

Clumping occurs immediately or at latest within ten minutes. To the other smear a drop of normal serum is added to serve as a control and to eliminate the confusion that may result from fragments of the dried smear.

The reaction is purely qualitative and is used as a preliminary to a standard Weil-Felix test. A positive result corresponds to a Weil-Felix titre of 1–50 or over. *John W. D. Megaw.*

BUSVINE (J. R.). **The Toxicity of some Common Fumigants to Body Lice.**—*Bull. Entom. Res.* 1943. Apr. Vol. 34. Pt. 1. pp. 19–26. With 1 fig. [Summary appears also in *Bulletin of Hygiene.*]

The author considers two situations under which it is desirable to know the effectiveness of fumigation against lice. One is where cases of typhus have occurred in a house and where this is being treated with the common fumigants hydrogen cyanide or sulphur dioxide. The other is where clothing infested with lice and eggs is treated on a small scale in a bin. As the result of experiments in the laboratory and in rooms, it was found that lice have about the same resistance as bed-bugs to the fumigants tested. Under practical conditions 16 oz. of hydrogen cyanide per 1,000 cubic feet for 6 hours at 4°C., or 13 oz. for 2 hours at 25°C., will kill lice and eggs; 2 lb. of sulphur per 1,000 cubic feet for 12 hours at 20°C. is also satisfactory. These fumigants are not considered suitable for clothing; hydrogen cyanide because of the danger; sulphur dioxide because it is likely to damage fabrics. For the fumigation of garments in bins, the solids naphthalene and paradichlorbenzene are very slow and unreliable. Liquids such as heavy naphtha or trichlorethylene, however, applied at the rate of 32 cc. in the bin for 5½ hours (equivalent to 2 gallons per 1,000 cubic feet) killed all lice and eggs. *V. B. Wigglesworth.*

SMITH (D. J. W.). **Studies in the Epidemiology of Q Fever. 11.—Experimental Infection of the Ticks** *Haemaphysalis bispinosa* **and** *Ornithodorus* **sp. with** *Rickettsia burneti.*—*Australian Jl. Experim. Biol. & Med. Sci.* 1942. Dec. Vol. 20. Pt. 4. pp. 295–296.

Haemaphysalis bispinosa, a tick which infests cattle in the coastal districts of southern Queensland and northern New South Wales, has been shown to be capable of transmitting Q fever from infected laboratory animals to healthy animals by its bite. Ticks infected in the larval stage were infective in the nymph stage, and those infected in the nymph stage were still infected in the adult stage, but infected adults did not transmit infection to laboratory animals on which they were fed. This failure was attributed to the fact that the ticks fed reluctantly, none of them becoming engorged.

The Rickettsiae in the infected ticks were found in the lumen and lining epithelium of the gut; those in the cells were seen only in the cytoplasm, not in the cell nuclei.

This tick is regarded as a probable transmitter of infection from cow to cow, and may possibly transmit infection from bush animals to cattle.

Ornithodorus gurneyi collected in a cave in North-West Queensland became infected by biting infected guineapigs, and individual specimens of the ticks were found to harbour live Rickettsiae for 129, 135, and 535 days, after the infecting feeds. The infected ticks failed to transmit infection to guineapigs.

In a footnote it is stated that the paper is incomplete and has been published because the investigations into the entomological aspects of Q fever have been suspended. *John W. D. Megaw.*

ZEMP (F. Eugene). **Q Fever.**—*Jl. Amer. Med. Assoc.* 1943. Mar. 13. Vol. 121. No. 11. pp. 828–830. [20 refs.]

In July 1942 a girl aged 18 suddenly became ill with high fever a week after returning from a visit to the mountainous country of western North Carolina. There is no mention of a bite by a tick but the patient is said to have gone on a number of "hikes." The fever lasted 45 days and was complicated by mild neuritis of the legs. During the first fortnight there were rather severe chills every day, and during this period the maximum daily temperature was between 104° and 105·8° F.; the minimum was never as low as normal. During the next two weeks the maximum ranged between 102° and 105·8° and there was a daily fall to normal. The fever then subsided gradually. There was no rash.

The earlier laboratory tests of various kinds were negative except for a positive Weil-Felix reaction (1–50) about the sixth day. Blood was sent on the 25th day to the U.S.A. Public Health Laboratory and was found to give a positive complement-fixation reaction (1–4) to Q fever; it was then negative to the Weil-Felix and other tests which included complement-fixation tests to Rocky Mountain spotted fever and endemic typhus.

[Although the patient was not regarded as being critically ill at any time this was an exceptionally severe attack of Q fever. The author, by implication, regards the disease as a form of tick-borne typhus, a suggestion already made by WILCOCKS in this *Bulletin* and one that appears to be justified by the known facts.] *John W. D. Megaw.*

DYER (R. E.). **"Q Fever."** Correspondence.—*Jl. Amer. Med. Assoc.* 1943. May 29. Vol. 122. No. 5. p. 331.

In this note Dyer refers to the paper by ZEMP (above). Dyer, in whose laboratory the serological tests in this case were carried out, points out that the titre of 1–4, at which the complement fixation was positive, is not regarded as significant. In the second place, Zemp does not mention that agglutination was positive against *Bact. typhosum* at a titre of 1–80 two and a half weeks after onset. Dyer considers that the case resembles rather the group of long continued fevers than a Rickettsial disease. *C. W.*

YELLOW FEVER.

LEWIS (D. J.). **Mosquitoes in relation to Yellow Fever in the Nuba Mountains, Anglo-Egyptian Sudan.**—*Ann. Trop. Med. & Parasit.* 1943. Apr. 30. Vol. 37. No. 1. pp. 65–76. With 1 map & 3 plates. [14 refs.]

An account of the species of mosquitoes found in the Nuba Mountains. This includes seven species known to be potential vectors of yellow fever, viz., *Aëdes aegypti*, *A. luteocephalus*, *A. simpsoni* var. *lilii*, *A. vittatus*, *A. metallicus*, *A. taylori* and *Taeniorhynchus africanus*.

Their estimated importance in the epidemic of 1940 [see KIRK, this *Bulletin*, 1942, Vol. 39, p. 69], deduced from a study of their prevalence and habits, is indicated in the following table :—

[illegible]

DENGUE ; SANDFLY FEVER.

WALKER (A. S.), MEYERS (E.), WOODHILL (A. R.) & MCCULLOCH (R. N.). **Dengue Fever.**—*Med. Jl. Australia.* 1942. Sept. 12. 29th Year. Vol. 2. No. 11. pp. 223–228. With 4 figs.

SHEE (J. C.). **A Clinical Sign in Sandfly Fever.**—*Indian Med. Gaz.* 1942. Dec. Vol. 77. No. 12. p. 732.

Varying degrees of choking of the optic discs were seen in 27 out of 30 cases of sandfly fever : in three exceptionally mild cases it was absent. The condition ranged from blurring of the edges of the discs with distension of the retinal veins to papilloedema with swelling of 2 to 2·5 D. It was seen in the earliest stages ; in one case six hours after the onset, but sometimes it was more pronounced on the second day. In severe cases it was still visible on the day after the crisis. It was regarded as being due to a rise in the pressure of the cerebrospinal fluid. The sign is claimed to be likely to help in diagnosis [but no mention is made of control examinations in other fevers]. In two cases in which the sign was present the diagnosis was uncertain : in one of these the patient developed catarrhal jaundice 15 days later ; in the other subtertian malaria parasites were found. These were not included in the series though they were regarded as possible cases of sandfly fever with a consecutive or concurrent disease.

John W. D. Megaw.

PLAGUE.

BULLETIN DE L'INSTITUT D'HYGIÈNE DU MAROC. 1941. N.S. Vol. 1. pp. 79–131.—Rapport sur l'activité des Services de la Direction de la Santé Publique et de l'Assistance pendant l'année 1941. [pp. 121–123.—Peste.] [**Plague in Morocco, 1941.**]

The regions surveyed are those of Agadir, Marrakesh and Casablanca. In Agadir the history of the outbreak of plague was the not infrequent one, that a native who evaded inspection by the authorities took with him goods belonging to individuals dead of plague and infected a healthy community. Within a week of his own death there occurred 29 cases of plague, of which 21 were fatal. The total number of cases bacteriologically confirmed in this region was 1,555. Plague in Casablanca was within the town and afforded proof, according to the author, of the correlation existing between the transit of grain and outbreak of plague in the town. The rôle of the flea, which is well established for rural plague, would appear here to be secondary [it is not easy to follow this reasoning ; the author does not amplify his statement]. Precautions taken were those which 30 years of experience of plague in Morocco have established as satisfactory : early detection and isolation of the sick after disinsectization ; vaccination and disinsectization of contacts ; continuation of vaccination of the inhabitants so as to create a barrier among the healthy to the further spread of plague. Special precautions were taken, and efficaciously, for the protection of the great Moroccan port of Casablanca. *W. F. Harvey.*

HECHT (Otto). Las pulgas de las ratas en Venezuela. (Nota preliminar.) [**The Fleas of Rats in Venezuela (Preliminary Note).**]—*Rev. Sanidad y Asistencia Social.* Caracas. 1942. Dec. Vol. 7. No. 6. pp. 811–820. With 2 figs. [26 refs.]

Some 3,400 fleas were collected from trapped rats during 1939–40 in the city of Caracas, capital of Venezuela, and 95 per cent. of these were *Xenopsylla cheopis*. This flea is recognized as the major vector of plague. No attempt was made to determine the species of host rat, but previous investigation had shown that 98 per cent. of the rats of Caracas were *Rattus norvegicus*. In Venezuela plague last appeared in the State of Aragua where there were 11 cases with eight deaths in 1939–40. The region is sparsely populated, covered with forest and situated on the border between Miranda and Aragua States. Rats in this area are mainly field rats and the plague outbreak, therefore, must be regarded as sylvatic. Some 400 fleas from rodents of undetermined species were examined and 97·2 per cent. proved to be species of the genus Rhopalopsyllus. So far the differences, mainly in the form of the 9th sternite and arrangement of its setae, have not been fully worked out. References are made to the species of Rhopalopsyllus which have been identified in the Argentine, Brazil, Ecuador and Panama. A bibliography provides the reader with necessary information as to original publications. *W. F. Harvey.*

CLARK (B. Maule) & GOLDBERG (S.). **Pneumonic Plague: Recovery in a Proved Case.**—*South African Med. Jl.* 1943. Feb. 27. Vol. 17. No. 4. pp. 57–60.

In this epidemic of pneumonic plague 11 cases occurred, all in natives, and one patient recovered. The origin of the outbreak could not be traced, but there was evidence of rodent plague in the district. There were no bubonic cases. Recovery from pneumonic plague is so rare that bacteriological proof of the causation is necessarily demanded. This was forthcoming. The patient was an old woman who lived in the same household as a family in which the two old parents, two sons and a daughter died of pneumonic plague. "She had been given 1 c.c. of live avirulent vaccine and 50 c.c. of anti-plague serum as a prophylactic measure five days before the onset of her illness. Directly she became ill she was treated with large doses of serum and was given 400–500 c.c. in all, intramuscularly and subcutaneously." Her symptoms resembled those of the other patients: pain in the chest, frequent loose cough and thin frothy sputum, which later contained bright red blood. Although culture of the sputum was negative, proof of plague infection came from guineapig inoculation by scarification.

This outbreak took place in a native location and vigorous control measures were adopted. These consisted in strict quarantine and vaccination with living avirulent *P. pestis*. [The vaccine was that of GRASSET (this *Bulletin*, 1942, Vol. 39, p. 311), a mixture of the E.V. and Tjiwidej strains.] Some 700 of the estimated population of 900 received vaccine treatment, and concentrated serum was given to close contacts. The authors of the paper themselves received prophylactic treatment: 50 c.c. of serum intramuscularly and 1 c.c. of vaccine. "The vaccine produced a mild local reaction with few, if any, general symptoms."

The serum treatment on the other hand, was followed by pain in the buttocks, a local rash with later constriction in the chest, a loose cough, and aching in the calf muscles. In a week or 10 days later still there appeared a generalized urticaria. *W. F. Harvey.*

AMOEBIASIS.

WESELMANN (Hans). Vorkommen von *Entamoeba histolytica* im Duodenum. [**The Finding of** *E. histolytica* **in the Duodenum.**]—*Deut. Trop. Ztschr.* 1942. Sept. 15. Vol. 46. No. 18. p. 457.

E. histolytica is usually found in the large intestine, rarely in the lower part of the small intestine. The author reports a case in which vegetative forms, with typical appearance and ingested red cells, were found in duodenal contents removed by duodenal sound, together with characteristic cysts containing four nuclei. Investigation by the sound was undertaken because it was thought that the chronic diarrhoea from which the patient suffered might have been due to *Giardia intestinalis* ; no amoebae were found in the faeces. The finding of cysts in the duodenum had previously been reported by KOLLE and HETSCH, but this is apparently the first time that vegetative forms have been recovered. Treatment of the patient with emetine caused rapid disappearance of all forms. *C. W.*

COORAY (Gerald H.). **Two Rare Complications of Intestinal Amoebiasis.**—*Indian Med. Gaz.* 1942. Dec. Vol. 77. No. 12. pp. 735–736. With 1 chart.

Rupture of liver abscess into the bile duct is rarely seen. A case is here reported in which the abscess ruptured into the bronchus and the patient coughed up chocolate-coloured pus which subsequently became bile-stained.

The second case was considered to be an example of primary amoebic infection of the lung. The physical signs on admission suggested a pleural effusion at the left base. There was no reasonable ground for suspecting hepatic amoebiasis since the liver was not tender and the X-ray findings were negative. The special features of the pleural fluid which indicated the diagnosis of amoebic infection were sterile chocolate-coloured fluid and the presence of Charcot-Leyden crystals. The diagnosis was fully established by finding both cystic and vegetative forms of *E. histolytica* in the faeces. Blood examination was of value as it showed a polymorphonuclear leucocytosis. The therapeutic test—the remarkable response to emetine injections—left no doubt that the effusion was due to amoebiasis. The absence of evidence of liver involvement together with the fact that the effusion was left-sided indicated that it was a primary infection. *P. Manson-Bahr.*

RELAPSING FEVER.

CLARK (Herbert C.). **Relapsing Fever in Panama.**—Reprinted from *Amer. Assoc. Advancement of Science.* Publication No. 18. pp. 29–34. [13 refs.]

The author gives a useful summary of the present state of our knowledge concerning relapsing fever in Panama. The disease has a very low incidence, as only 129 cases, with three deaths, are listed among 1,340,024 hospital discharges, since 1906. These figures include the records of hospitals not only in Panama, but also in Cuba, Spanish Honduras, Guatemala, Costa Rica, Colombia and Jamaica. The author is of the opinion that the disease may be more common among rural native children than these figures indicate, since it is very infrequent for an adult rural native to acquire a severe attack. Non-immune foreign white people visiting rural districts and occupying native huts are much more liable to become infected.

The local vectors are *Ornithodorus talajé* and *O. venezuelensis*. The former feeds on a great variety of hosts including mammals, birds and reptiles as well as man. *O. venezuelensis* feeds especially on man and animals, and is probably the chief transmitter.

Relapsing fever in Panama is apparently more prevalent among wild animals, which probably act as a reservoir. Monkeys, vampire bats, opossums, armadillos, cattle, horses, mules, and single examples of the grison and otter, have all been found infected with spirochaetes, apparently identical with the relapsing fever strain. Although rats would seem to be an obvious reservoir none has yet been found infected in nature. White mice, rats and marmosets are the best animals for laboratory use, the latter being extremely sensitive.

Natives, except for young children, show a high degree of tolerance, which has probably been acquired in childhood. Foreign white non-immunes develop severe acute attacks and the disease may run a long course unless diagnosis is made and satisfactory treatment is given. Rural native people seldom seek treatment. "The name *Spirochaeta neotropicalis* has now been recorded for the spirochete of relapsing fever in Central and South America." *E. Hindle.*

KAMMER (Victor Maria). **Sobita in the Treatment of Relapsing Fever: a Short Study of Cases on the Upper Zambezi.**—*East African Med. Jl.* 1943. Feb. Vol. 20. No. 2. pp. 55–61. With 2 graphs & 1 fig.

The author treated 19 cases of relapsing fever (*S. duttoni*) occurring in African natives on the upper Zambezi. Sobita (sodium potassium bismuth tartrate) was found to give very satisfactory results, as out of 16 patients treated with this substance only four showed any febrile relapse and these recovered without further injections. The dosage used was for adults 0·2 gm. sobita in 3 cc. of water injected intramuscularly on two consecutive days, and for children 2 to 10 years old, 0·1 gm. sobita in 2 cc. water on two consecutive days. Infants under two years of age were given only one injection of 0·1 gm. sobita. On the other hand, a European patient treated with N.A.B. and sobita failed to respond to the treatment and showed several relapses.

The author emphasizes that the credit for introducing sobita in the treatment of relapsing fever belongs to Dr. John TODD, who used it at the David Gordon Memorial Hospital, Livingstonia, Nyasaland [see this *Bulletin*, 1930, Vol. 27, p. 694]. *E. Hindle.*

YAWS AND SYPHILIS.

ROST (Glenn S.). **Roentgen Manifestations of Bejel ("Endemic Syphilis") as observed in the Euphrates River Valley.**—*Radiology.* 1942. Mar. Vol. 38. No. 3. pp. 320–325. With 6 figs. [13 refs.]

This is the first radiographic study of the bone lesions of the non-venereal syphilis of children previously studied by E. H. HUDSON—and from the same area, Dier-ez-Zor [see this *Bulletin*, 1936, Vol. 33, p. 966; 1937, Vol. 34, p. 965].

All the subjects gave histories of bejel from 1 to 39 years previously and "practically" all were Kahn positive. "Commonly accepted clinical criteria of heredosyphilis were absent." No radiographic evidence of cardiovascular involvement or Charcot's joints was found.

The main changes in the early (secondary) stage are periosteal and endosteal proliferation with or without areas of rarefaction in the shafts of long bones. The former may be localized or generalized on the bone and may be homogeneous or stratified; the latter is usually localized, well or ill-defined and may involve the periosteal deposits and cortex (or also the medulla—probably in the tertiary stage). The density of the underlying cortex may be increased and medullary cavity may be obliterated.

In the later (tertiary) stage localized gummata with bony thickening and increased cortical density occur, occasionally with sequestra. Gumma-like lesions involving the medulla may extend to the end of the bone and reach the joint. The usual, but not frequent, joint lesion is localized destruction of the articular cartilage with irregular erosion of the underlying epiphysis and related increased bony density. Generalized loss of bony density was absent.

Spontaneous healing results in localized or generalized bony thickening or deformity resembling sabre-tibiae. All lesions respond readily to specific anti-syphilitic therapy.

With few exceptions, notably osteo-chondritis and neuropathic joint lesions, syphilitic bone lesions are comparable with those of bejel.

[No mention is made of the number and ages of the cases studied, the incidence of bone lesions in bejel, or the occurrence of ulceration of bone lesions through the skin. No reference is made to any paper on yaws bone lesions, many of which illustrate similar lesions. If non-bejel cases can be investigated, a difficulty in such a community, it may be found that sabre-tibiae are not related to bejel but possibly to dietetic deficiencies. Unpublished work (by the reviewer) of yaws bone lesions in northern Uganda agrees very closely with this paper. No osteo-chondritis or neuropathic joint lesions were observed. This may be due to the age of acquired yaws and bejel cases compared with that at which syphilitic osteochondritis occurs, *i.e.* the first few weeks of life, and to the absence or great infrequency of lesions of the central nervous system. In this yaws study it was found that the appearances of secondary and tertiary bone lesions depended more upon the age of the patient than upon duration of the infection. Tertiary lesions were sometimes seen in children 2–3 years after infection and were different from those seen in adults.]

C. J. Hackett.

LEPROSY.

McCoy (G. W.). **Observations on the Epidemiology of Leprosy.**—*Public Health Rep.* 1942. Dec. 18. Vol. 57. No. 51. pp. 1935–1943.

This paper brings the evidence regarding the incidence of leprosy in the United States up to date. The author emphasizes the tendency of the disease to disappear as an indigenous disease from parts of Europe (except in the south) and from north America (except in the States bordering on the Gulf of Mexico). Cases occur among those returning to other parts of the United States from leprosy infected countries, but very few new infections can be traced to them. In New York only two cases have been discovered which might possibly have been infected there, against 38 probably infected in other countries. The latter include 13 from the West Indies and from 3 to 1 only from 30 other countries. In a similar manner in the central north-western States, particularly Minnesota, between 100 and 200 cases among Scandinavian immigrants to Minnesota gave rise to very few indigenous cases and none of 78 children born to them developed the disease. Among 40 closely investigated imported lepers only 7 contact cases have been traced and those 7 gave rise to only one doubtful case. The experience of California has been very similar, with 475 leprosy cases imported mainly from Mexico, the islands of the Pacific and from China between 1913 and 1940; 90 of these have died. Yet not more than 14 were probably infected within the State of California, including two children of a leprous Japanese mother. The imported cases and deaths have declined in recent years with close examination of immigrants and the exclusion of lepers, and because 165 of them have been sent to the Carville leprosarium. No less than 165 of the total cases came from Mexico, 37 from the Philippines and 22 from China. On the other hand in the southern States of Louisiana, Florida and Texas imported cases of leprosy have resulted in the establishment of foci of infection which show a strong tendency to perpetuate themselves; apart from which leprosy transmission occurs so rarely in the U.S.A. that it is negligible from the public health point of view. *L. Rogers.*

Gillet (R.). Sur un nouveau cas de lèpre d'origine soudanaise observé à El Goléa. [**A New Case of Leprosy from the Sudan observed in El Goléa.**]—*Arch. Inst. Pasteur d'Algérie.* 1940. Dec. Vol. 18. No. 4. pp. 471–476. With 2 figs. on 1 plate. [10 refs.]

Escalona (Ernesto). Algunas consideraciones clínicas y terapéuticas sobre enfermos lepromatosos. [**Leprosy. Clinical and Therapeutical Observations.**]—*Medicina.* Mexico. 1943. Mar. 25. Vol. 23. No. 432. pp. 97–102.

There is little fresh or original in this contribution. It is a paper read before the Dermatological Society of Mexico and briefly reviews the subject of leprosy, the classification of cases and their treatment with chaulmoogra combined with benzocaine (90 parts chaulmoogra oil, 10 of olive oil, and 3 of benzocaine) as used at the Carville Leprosarium.

The author does not regard the erysipelatoid leprotic manifestation as a form of the disease, but as a true erysipelas due to secondary infection of a leprous lesion by a streptococcus, which is promptly overcome by treatment with sulphanilamide. *H. Harold Scott.*

BURSCHKIES (Karl). Zur Chemotherapie der Lepra. [**The Chemotherapy of Leprosy.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1942. Nov. 9. Vol. 124. No. 3/4. pp. 333–340. [23 refs.]

After some introductory remarks on the incidence and causation of leprosy the author refers to the early work of BARROWCLIFF and POWER and others on the chemistry of chaulmoogra and hydnocarpus oils, and to trials of metallic salts of their fatty acids without beneficial results in leprosy, and to the failure of trials of propyl-butyl and amyl esters, etc. The work of WALKER and SWEENEY and of SCHÖBL on the *in vitro* action of preparations of chaulmoogra and hydnocarpus acids in inhibiting the growth of acid-fast bacilli obtained from patients with leprosy is mentioned, and the various suggestions made regarding the possible relationship between the chemical constitution, or optical activity, and therapeutic properties of the chaulmoogra series of fatty acids, such as the closed carbon ring formula, are discussed. The production of the ethyl esters by POWER and GORNALL and their use by others is also referred to. On the other hand ADAMS and his colleagues attribute the activity, not to the chemical constitution, saturated or unsaturated condition or optical activity, but exclusively to the molecular weight and related physical properties.

To clarify the position animal experimental tests are necessary, but as even hamsters have not proved suitable for regular infection with the human leprosy bacillus it is necessary to utilize rats infected with the closely allied Stéfansky bacillus in order to test the activity of various organic acids against rat leprosy. White mice infected by injection with the rat leprosy bacillus can be used for testing preparations supplied by the dye industry, such as dihydro-chaulmoogra-acid-cholesterin ester and dihydro-chaulmoogra-acid-benzyl ester, etc. The author considers that the optical activity and other special features of the chaulmoogra fatty acids are not related to their activity, so the way is opened up for the trial of other fatty acids of different chemical constitution in the experimental treatment of rat leprosy, and he has especially worked at compounds of cinnamic acid, such as cinnamoyl-glycol-acid-chaulmoogryl ester and other closely related substances of which he gives the formulae, for details of which the original paper should be consulted by those interested in this highly technical subject. Further work on these lines, he hopes, may result in important progress in the treatment of human leprosy. Tests of their action should first be made *in vitro* on acid-fast bacilli to ascertain which of the compounds should be further tried on rat leprosy and eventually on human leprosy. [See also this *Bulletin*, 1940, Vol. 37, p. 45; 1941, Vol. 38, p. 225.] *L. Rogers.*

FAGET (G. H.), JOHANSEN (F. A.) & ROSS (Hilary). **Sulfanilamide in the Treatment of Leprosy.**—*Public Health Rep.* 1942. Dec. 11. Vol. 57. No. 50. pp. 1892–1899.

This is a report on a carefully controlled trial of the drug, mainly in lepromatous cases, after examinations of the blood and of the renal functions. Eight patients with lepromatous lesions and one with neural lesions were first treated with doses producing an average blood concentration of 9·0 mgm. per cent.; in seven of these febrile reactions occurred and the course had to be stopped. In six of the above, given

a second course, and in 11 other patients the average blood concentration of the drug was 5·0 mgm., but in six high fever necessitated stopping the drug. Two patients were dangerously ill but recovered. Some degree of anaemia occurred in all and leucocytosis in many. The authors conclude that the drug is useful for secondary infections but not as a curative remedy for leprous lesions. *L. Rogers.*

GRASSET (E.) & DAVISON (A. R.). **Antigenic Treatment of Leprosy by means of a Non-Acid-Fast Variety of Tubercle Bacillus (N.A.C.).**—*South African Jl. Med. Sci.* 1942. Nov. Vol. 7. No. 4. pp. 236–244.

This is a report on a careful trial in leprosy of an antigen prepared from a non-acid-fast variety of tubercle bacillus, referred to as N.A.C., which had previously been recorded to be of value in the treatment of certain tuberculous infections by Grasset, who obtained it by culture in a liquid Sauton medium from a bovine strain of tubercle bacillus in 1934. This modified tubercle bacillus stains by the Gram and Much methods, but does not retain the Ziehl fixing colouration. In tuberculosis an emulsion of this strain, when injected, is claimed to produce fibrotic reaction with beneficial therapeutic effects. Tuberculin has previously been used in leprosy without definite beneficial results.

The present authors selected 20 neural and 20 lepromatous cases, including representatives of each type and sub-type of leprosy, and they compare the results with those of other treatment in 24 neural cases selected at random. In the first place they report that no benefit resulted in the lepromatous cases, which are, therefore, excluded from further consideration. The neural lesions included raised red macules, flat red or pink macules, and grey granular macules; patients whose nasal or skin smears were showing or had shown *Myco. leprae*, but whose skins were normal, were also included. Fifteen of the 20 cases had shown leprosy bacilli at some time, yet all of them became negative during the treatment, with the exception of one patient who died of cerebral haemorrhage and another of pneumonia. Moreover, in 16 cases the skin lesions became absorbed. In contrast the 24 control cases showed prolonged absence of the lepra bacilli in only four, and four showed absence of activity, but in the rest the skin lesions persisted. The N.A.C. was injected bi-weekly in doses rising from 0·5 to 10 cc. with very slight and passing reactions, but at the end of three months no change was evident in the external manifestations, so at the patients' request the routine intradermal injections of iodized esters of hydnocarpus were resumed and the N.A.C. continued as before. At the time of reporting the 15 improved cases had been clinically and bacteriologically negative for a minimum period of 11 months. The addition of N.A.C. to hydnocarpus esters therefore appears to be worthy of further trial in positive neural cases of leprosy. *L. Rogers.*

HELMINTHIASIS.

JAFFÉ (Werner). Leche de Higueron. [**The Sap of Fig Trees (as an Anthelmintic).**]—*Rev. Sanidad y Asistencia Social.* Caracas. 1942. Dec. Vol. 7. No. 6. pp. 837–846. [15 refs.] English summary.

" (1) The sap of fig trees, which is used as an anthelmintic, is called 'leche de higuerón'.

" (2) It has been fractionated to establish the active agent, which has proved to be only the proteolytic ferment 'ficin'.

" (3) The effect on the parasites is that the ferment digests them.

" (4) The toxicity has been preliminarily determined on mice and proved to be faint.

" (5) The genus of the fig trees is difficult to be classified. More than half of the species of this genus are inactive because of the absence of the active agent 'ficin'.

" (6) An easy experiment to establish the presence of ficin in saps of unknown fig trees is described.

" (7) The destruction of the ficin by diluted chlorhydric acid is demonstrated. The conclusion of this experiment is to apply simultaneously sodium bicarbonate and 'leche de higuerón'.

" (8) The 'in vitro' action on ascaris, necator, trichocephalos, oxyures of human origin and ancylostomum canis has been examined. A positive effect has been obtained in each case."

ENGELHARDT (J. C.). "Bayer 205" in der Diagnostik der Blasenbilharziose. [**Bayer 205 in the Diagnosis of Vesical Schistosomiasis.**]—*Deut. Trop. Ztschr.* 1942. Dec. 15. Vol. 46. No. 24. pp. 597–603.

The author's work confirms KUNERT's conclusion that intravenous injection of Bayer 205 provokes the production of eggs by *Schistosoma haematobium* [see this *Bulletin*, 1939, Vol. 36, p. 622]. This procedure can therefore be used for the diagnosis of those in whose urine spined eggs cannot be found by repeated examinations, and also to find out whether all the trematodes have been killed by treatment with tartar emetic or fouadin. Kunert used "3·0 Bayer 205," but the author found that a single intravenous injection of "1·0 Bayer 205" was enough to provoke with certainty the egg production, eggs being found in the urine of 66·7 per cent. of his cases after this dose, usually within 18 hours and sometimes within three hours. This dose was sufficient in practice. The few cases in which it does not provoke egg production contain only a few trematodes and are, in the author's opinion, without significance. Larger doses provoke only temporary egg production and may harm the patient, especially if the disease has caused kidney damage.

The diagnosis of vesical schistosomiasis is discussed. Eosinophilia can only be taken as evidence if other helminth infestations can be excluded and these are common in areas where schistosomiasis occurs. Cystoscopy is often difficult under tropical conditions, but it must not be ruled out. The complement fixation reaction, done with extract of the digestive glands of snails, is a useful aid; so is the skin reaction done with extract of Schistosoma.

Half the author's patients (all old cases, in contrast to the early cases treated by Kunert) were given an average total dose of 50 cc. of fouadin, the remainder an average total dose of 1·3 gm. of tartar emetic, until no eggs were found in the urine or no granular or calcified eggs were seen. This was regularly so after a maximum dose of 62 cc. of fouadin or 1·9 gm. of tartar emetic. If daily urine examination for 10 days revealed no eggs, the patients had an intravenous injection of 1·0 [? gm.] Bayer 205, a second of 2·0 after 10 days and a third of 3·0 after another 10 days. The urine was examined after 3, 6 and 18 hours. In 86 per cent. of patients erythrocytes were found; in 20 per cent. there was albuminuria after 1·0 Bayer 205; all showed bladder epithelium before treatment and this was increased after it, this being ascribed to damage done by the trematodes in these old cases. In 70 per cent. of the patients no eggs were found after all these provocative doses. After 1·0 Bayer 205 eggs reappeared in the urine in 20 per cent. of cases, although in 5 per cent. of these there were only some dead eggs. After the second injection of 2·0 Bayer 205, eggs were found in 10 per cent. of patients, 5 per cent. of these being positive for the first time. In 15 per cent. of those cases which were positive after the first provocation the urine was negative after the second provocation and remained so after the third dose of 3·0 Bayer 205. After this third dose of 3·0 only 5 per cent. of all the cases still showed living eggs. In one patient Bayer 205 caused an alarming inflammatory condition of the skin and mucosae.

G. Lapage.

VALENCIA PARPARCÉN (J.). Tratamiento medico de la Schistosomiasis Mansoni en los adultos. [**Treatment of** *S. mansoni* **Infection in Adults.**] —*Rev. Policlinica Caracas.* 1942. Nov.–Dec. Vol. 11. No. 67. pp. 293–307.

LUBINSKY (G. A.). Die zweiten Zwischenwirte des Katzenleberegels (*Opistorchis felineus*) in der Umgebung Kiews. [**The Second Intermediate Host of** *Opisthorchis felineus* **in the Neighbourhood of Kieff.**]—*Zent. f. Bakt.* II. Abt. 1942. Nov. 25. Vol. 105. No. 14/16. pp. 255–257. [10 refs.]

Rabbits and young cats were experimentally infested with this fluke by feeding them with the flesh of *Tinca tinca* (tench), *Chondrostoma nasus* and *Leuciscus idus* (Id or Nerfling). The feeding of five other species of fish, including *Abramis brama* (bream) and *Rutilus rutilus* (roach) did not produce infestations. All the fish used were bought in a place 6 km. from Kieff, where almost all the cats have the fluke. The degree of infestation of the Dnieper fish in the Kieff area is very low.

The largest focus of human opisthorchiasis is on the lower Dnieper (17·7 per cent. of the fisherfolk at Krasno-Grigorievsk and 26 per cent. at Golaya-Prinstany). The fisherfolk of the middle and upper Dnieper are less commonly infested (1 per cent. at Cherkazy and 1·5 per cent. at Chernobyl). Other cases occur in the Donetz and Desna basins. In domestic animals the fluke occurs on the Rivers Bug and Ob.

G. Lapage.

LASNIER (Eugenio P.) & CASSINELLI (J. F.). Diagnostico del quiste hidatico pulmonar en la expectoración incluida. **Diagnosis of Pulmonary Hydatid from Sputum Examination.**—*Arch. Uruguayos de Med., Cirug. y Especialidades.* 1942. Nov. Vol. 21. No. 5. pp. 564–575. With 5 figs. (3 coloured).

In 1940 Professor Lasnier first brought forward his suggestion that the recognition of minute fragments of hydatid wall could be particularly readily made by special staining of the sputum. In this article he returns more fully to the subject. Best's carmine is used and the chitin fragments show out remarkably clearly. The effects are well seen if a portion of hydatid wall is fixed in a mixture of 10–12 per cent. formol in 3–5 per cent. acetic acid and embedded in paraffin. Best's carmine will stain cellular elements, granulations, glycogen and inclusions, but the hydatid membrane contains a polysaccharide resistant to the action of water or saliva and takes the stain avidly. Of course, large fragments can be seen by the unaided eye, but with this method very minute fragments will suffice for diagnosis and it is useful where a liver hydatid has ruptured into the lung, or where the cyst has suppurated. Coloured figures illustrate very strikingly the things to look for. The changes which take place in the cyst wall after it breaks up are described in the following stages: (1) Change in the cement between the layers. (2) Disintegration of the lamina. (3) Similar, or analogous, changes in the cement between the lamellae and in the lamellae themselves. (4) Vacuolization and granulation of the layers. (5) Disintegration of them further, and, finally (6) Phagocytosis of the fragments and granules. [There are even better pictures reproduced in a succeeding article by Professor ARDAO on Suppurating Hydatid of the Lung, in the same issue of this Journal.]

H. Harold Scott.

LANGLEY (G. F.). **Primary Echinococcal Cyst of the Uterus.**—*Brit. Jl. Surgery.* 1943. Jan. Vol. 30. No. 119. pp. 278–280. With 1 fig.

LOPEZ-NEYRA (Carlos Rodriguez). **Raillietinosis humanas en la zona tropical.**—*Medicina Colonial.* Madrid. 1943. April 1. Vol. 1. No. 4. pp. 215–242.

A general review of the subject.

YENIKOMSHIAN (H. A.) & SHEHADI (William H.). **Duodenal Ulcer Syndrome caused by Ankylostomiasis. Report of Twenty-Five Cases with Gastric Acidity and Roentgenological Studies.**—*Amer. Jl. Roentgenology.* 1943. Jan. Vol. 49. No. 1. pp. 39–48. With 2 figs. & 1 chart. [25 refs.] [Summary taken from the "Medical Letter" prepared by the American Medical Association.]

It is well known that gastrointestinal disturbances caused by hookworm disease may appear in different clinical forms, including that of duodenal ulcer. Symptoms are often vague and indefinite, the patients complaining of heartburn, flatulence, a feeling of fullness of the abdomen and irregular bowel movements. In this report from the American University, Beirut, Syria, 25 patients whose clinical history was suggestive of chronic duodenal ulcer but in whom stool examinations revealed presence of ova of Ankylostoma duodenale

were studied with regard to gastric acidity and roentgenologic findings. Estimation of free gastric acidity showed a rise to a higher level in these patients than that obtained in duodenal ulcer. In spite of varying degrees of severe anemia, such a high gastric acidity was maintained. Roentgenologic studies of these cases showed evidence of swelling of the duodenal mucosa, inconstant deformity of the duodenal bulb (duodenitis without ulcer niche), hyperperistalsis of stomach and duodenum, and, commonly, reversed peristalsis of the duodenum without obstruction. Administration of a vermifuge successfully resulted in the elimination of epigastric pain within twenty-four hours, and the restoration of the duodenal wall in from eleven to twenty-four days in these cases.

ANDREWS (Justin). **Modern Views on the Treatment and Prevention of Hookworm Disease.**—*Ann. Intern. Med.* 1942. Dec. Vol. 17. No. 6. pp. 891–901. With 2 figs. [25 refs.]

The author summarizes our present-day knowledge of the control of hookworm disease, because the more recent knowledge is not yet given in medical texts. After briefly referring to anthelmintics used before thymol became the standard remedy half a century ago, the author discusses the merits and drawbacks of oil of chenopodium and carbon tetrachloride. Carbon tetrachloride is " undoubtedly the most effective and most conveniently administered hookworm anthelmintic now known." A single dose removes all the worms from 60–90 per cent. of cases ; but it is occasionally, though rarely, toxic. Severe poisoning or death occurs in an extremely small number of cases. The mechanism of its toxicity is discussed. The damage it does to the liver precludes its administration to alcoholics and, if heavy roundworm infestations are present, it stimulates the worms to abnormal activity, so that the intestine may be blocked by solid plugs of worms and they may migrate forwards to the nose or pharynx or up the bile or pancreatic ducts. Mixtures of carbon tetrachloride and chenopodium are highly effective, but both of these drugs have undesirable toxic properties.

Tetrachlorethylene is less effective than carbon tetrachloride, but it is almost non-toxic. The author's own work indicates that although one treatment with it will not remove the last hookworm from more than 50 per cent. of patients, it will remove about 90 per cent. of all hookworms. Two treatments with it are equivalent to and much safer than one dose of carbon tetrachloride. Alcoholism and ascariasis are practically the only contra-indications.

Hexylresorcinol is an ideal drug for pre-hookworm treatment when Ascaris is present. If pills of it are swallowed, and are not chewed, there are no known contraindications and it can be given repeatedly to small children, aged persons and debilitated individuals. In doses of 1 gm. it removes practically all roundworms [presumably the author means Ascaris] and about 70 per cent. of hookworms, although only a small percentage of patients are rendered hookworm-free by a single dose. The author recommends tetrachlorethylene when hookworms only are present ; when " roundworms " are also present he prefers hexylresorcinol followed by tetrachlorethylene, or several rapidly successive doses of hexylresorcinol.

Recent American work on the control of hookworm disease is briefly discussed. A distinction is now drawn between hookworm

disease in patients in whom hookworms suck blood more rapidly than it can be replaced, so that anaemia results, and subclinical hookworm infestation in patients from whom blood is not removed more quickly than it can be replaced. In the opinion of the author, preventive measures should detect, prevent and control hookworm disease rather than subclinical infection [*cf.* HILL and ANDREWS, this *Bulletin*, 1943, Vol. 40, p. 324]. Hookworm anaemia should be differentiated from anaemia due to other causes; the family rather than the individual should be the unit of investigation; sanitation and education of the people must be undertaken. The author refers to the work of FOSTER, CORT and other American workers, who have shown that dogs develop a highly protective immunity to the dog hookworm, which can be broken down by dietary deficiencies. This immunity is separate from the haematopoietic potentialities of the dog. The time may come when control and cure of human hookworm disease will be possible by "dietary manipulation." *G. Lapage.*

HAWKING (Frank). **The Distribution of Filarioid Infections in East Africa: Review.**—*Jl. Trop. Med. & Hyg.* 1942. Dec.–1943. Jan. Vol. 45. No. 20. pp. 159–165. [39 refs.]

"(1) A review is given of the literature relating to the distribution of filarioid infections in East Africa.

"(2) *Wuchereria bancrofti* is common in the coastal regions of Kenya and of Tanganyika Territory, in the region south of Lake Victoria, in the Liwale and Tukuyu districts of Tanganyika, in the West Nile province of Uganda and in the region north of Lake Kioga. It is rare or absent in the Arusha-Moshi region, in most of Kenya, and along the eastern, northern and western sides of Lake Victoria.

"(3) *Acanthocheilonema perstans* is very frequent in the regions to the north, west and south-west of Lake Victoria and in the Liwale region.

"(4) *Loa loa* is virtually unknown in East Africa.

"(5) *Onchocerca volvulus* occurs in the region north of Lake Victoria, and both north and south of the Kavirondo Gulf; small foci of infestation also occur around Tukuyu and Njombe.

"(6) *Dracunculus medinensis* occurs only in the northern parts of Uganda."

SEMADENI (B.). Histologischer Befund bei einem Fall von zahlreichen Mikrofilarien beider Augen. [**Histological Appearances in a Case with Numerous Microfilariae in Both Eyes.**]—*Schweiz. Med. Woch.* 1943. Jan. 16. Vol. 73. No. 3. pp. 75–77. With 10 figs.

The author describes the histology of the eyes of a Swiss geologist who was infested with *Onchocerca volvulus* at some time while he worked in the Sudan and Algeria. The condition was diagnosed with the slit-lamp microscope, which revealed about 300 living microfilariae especially located in the anterior layers of the corneal parenchyma. The eyes showed some reddening round the cornea, which was slightly clouded by many inflammatory foci with slight pannus formation in places on the corneal margin. There was an eosinophilia of 25 per cent. and some general symptoms, *e.g.*, skin eruptions, swelling of the nose and ear, diarrhoea, night sweats, headache, disturbances of memory. The patient was given emetine and fouadin, but he died later as a

result of a mountaineering accident. Sections of the corpse failed to reveal adult Onchocerca, but sections of the eye confirmed the presence of microfilariae in it. They were present practically everywhere where there were lymphatics: they were found in the corneal parenchyma, where there was inflammatory reaction, but there was no cellular infiltration round the larvae. They were also found in the subconjunctival tissue, in the iris, in the outer scleral fibres and in the episcleral spaces, in none of which situations were they to be found clinically. They were especially well seen in the ciliary body. The choroid, vitreous humour, retina, lens and optic nerve had neither microfilariae nor inflammatory reactions. The slit-lamp microscope made possible the diagnosis of this rare condition in the living patient. The paper is illustrated by good photomicrographs. *G. Lapage.*

MAZZOTTI (Luis) & OSORIO (M. Teresa). Comparación de las tecnicas de Hall y de Graham en el diagnostico de la oxiuriasis. [**Comparison of the Techniques of Hall and Graham for the Diagnosis of Oxyuriasis.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Dec. Vol. 3. No. 4. pp. 323–328. With 2 figs. English summary (9 lines).

After a brief review of some of the literature on the incidence of human oxyuriasis in the United States, Canada, the Philippine Islands and Mexico, the authors describe the NIH swab introduced by HALL [this *Bulletin*, 1937, Vol. 34, p. 878] and the swab devised by GRAHAM [both are illustrated in this *Bulletin*, 1942, Vol. 39, p. 780]. Hall's swab consists of a 25 mm. square of plain, non-waterproof cellophane folded over and fixed on to a glass rod by a rubber ring; the perianal folds are stroked radially with it. It is then smoothed out on a slide in water or N/10 NaOH for microscopic examination. Graham's swab consists of a piece of Scotch cellulose tape half an inch broad and 8 cm. long, which is folded over lengthwise till the two ends are apposed, the adhesive surface being outwards; the apposed ends are held in forceps so that the adhesive surface can be applied to the perianal skin; the eggs adhere to it and the tape can then be examined on a slide. Mazzotti and Osorio used, however, a piece of tape 5 cm. long without doubling over the ends; apparently they held the tape lengthwise in forceps.

During five successive days they examined 17 children who had previously been shown to be heavily infested with Enterobius. The NIH swab was used first on each of these children and then the Graham swab, each child being, therefore, examined twice on five successive days. Of the 85 double examinations thus made, 82 (95·5 per cent.) were positive with the Graham swab, while 78 (91·7 per cent.) were positive with the NIH swab. On three occasions both swabs were negative.

Out of 240 children of a school in Mexico City examined in the same way 109 (45 per cent.) were positive with the Graham swab and 72 (30 per cent.) were positive with the NIH swab.

In 65 per cent. of the examinations the number of eggs found by the Graham swab was greater than the number found by the NIH swab. Thus the Graham swab appeared to be the better of the two, especially for the detection of light infestations. The authors point out that some of the negative results obtained with the Graham swab were due to the use of this swab after the NIH swab. The Graham swab

requires rather more care than the NIH swab, but the NIH swab is easier to use on adult males with abundant perianal hair.

[KUITUNEN-EKBAUM (this *Bulletin*, 1942, Vol. 39, p. 780) found the NIH swab more efficient and more convenient, because the Graham swab may stick to the skin and its removal may cause some discomfort. The NIH swab was adopted as the standard means of diagnosis by the investigators in the United States, whose 27 papers are summarized by CRAM below.] *G. Lapage.*

CRAM (Eloise B.). **Studies on Oxyuriasis. XXVIII. Summary and Conclusions.**—*Amer. Jl. Dis. Children.* 1943. Jan. Vol. 65. No. 1, pp. 46–59. [Numerous refs.]

This paper summarizes the 27 papers published in various journals, some of them not readily accessible, written by American workers who have carried out the study of oxyuriasis started by HALL in 1936. The following are the main conclusions.

The exact life-history of *Enterobius vermicularis* has never been worked out, because it cannot be established in any experimental animal. Studies of infested boys showed that, at 8 p.m., the females were 1 inch above the anal muco-cutaneous junction, at 9 p.m., when the boys went to bed, they were at this junction and by 9·30 p.m., on the skin as far forward as the scrotum or 2½ inches behind or to the sides of the anus; they preferred moist areas. Each female produces about 11,000 eggs. Embryonated eggs were found in dust from all rooms of infested households and infestation by inhalation of this dust is theoretically possible. The eggs survive best under moist, cool conditions and cannot be killed by fumigation with HCN; para-dichlorbenzene and naphthalene are also useless. Prevention of infestation is very difficult; even strict hygienic rules may fail. For diagnosis faecal examination is inadequate. The NIH swab was used as the standard method of diagnosis, but even with this it was hard to detect all cases. Repeated swabs are necessary, as many as seven being required for some members of families. The best time to take swabs is immediately after the patient gets up and before he goes to the toilet. Dermal tests were highly specific, but intradermal tests with antigen dilutions up to and including 1 : 5,000 were not, because they gave positives with infestations with other species of helminths.

Examination of the population of Washington, D.C., showed that 41·5 per cent. of the white adults and children examined were infested and 12·9 per cent. of the negroes. Females were not appreciably more frequently infested than males. Incidence was highest in children of school age, lowest in adults; children under 14 appeared to be more susceptible. Whites were more heavily infested than negroes. The infestations were often familial. If one case is found in a family, probably most or all of the children are infested and one or both parents may be. Infestations were not confined to older and congested areas, nor to any social level.

A slight eosinophilia occurs, but no anaemia. There was no evidence of association of gastro-intestinal symptoms, appendicitis, abdominal pain, craving for sweets, enuresis, nail-biting, thumb-sucking, nose picking or grating of teeth with oxyuriasis. Tetrachlorethylene treatment improved appetite. In girls mucoid vaginal discharge was attributed to the entry of the worms into the vulva; a single vulval swab was positive in 14 out of 45 infested girls. Restlessness and

insomnia were common. Lack of co-operation, inattention, feelings of shame and inferiority improved with treatment. Treatment was checked by seven consecutive swabs taken from the 10th to the 42nd day after treatment ended. A drug must be 100 per cent. efficient or infestations will build up again. Oil of chenopodium and carbon tetrachloride were not efficient. Tetrachlorethylene was best for single dose treatment.

After a light supper and, later, a high soap enema, the patient was given next morning, without breakfast, 0·1 cc. of tetrachlorethylene in 30 cc. of $MgSO_4$ plus 60 cc. of water, or in magnesium citrate. Tetrachlorethylene is more efficient in lightly infested cases. With hexylresorcinol (1 in 2,000 in water) 10 enemas spread over three weeks were the minimum necessary for eradication; some patients needed more. The drug failed when it was given as a single dose in pill form. The efficiency of santonin was under 50 per cent. Gentian violet was found to be better than any other drug. For adults two tablets, each of 32 mgm., three times a day before meals and for children 10 mgm. a day for each year of apparent, not chronological age, are given, the total dose for each day being divided into three doses for children. It can be given for 10 consecutive days or for two periods of eight days with a rest of seven days between. Both water-soluble and enteric-coated tablets were used and treatment was checked by seven consecutive daily swabs. Out of 224 persons treated 189 (84 per cent.) were freed of the infestation. About 39 per cent. had gastro-intestinal upsets, but these were temporary and quickly disappeared when the dose was reduced or given up for a day or two. The drug is contra-indicated when there is concomitant infestation with *Ascaris lumbricoides*, or cardiac, renal, hepatic or intestinal disease is present, or alcohol has been taken recently. *G. Lapage.*

JOLLY (R. H. H.). **Trichiniasis.**—*Med. Officer.* 1943. Jan. 9. Vol. 69. No. 2. pp. 13–14.

This paper is reviewed in *Bulletin of Hygiene*, 1943, Vol. 18, p. 383.

HATIEGANU (J.) & FODOR (O.). Symptomenkomplex der chronischen Hypoglykämie bei der Trichinose. [**The Symptom Complex of Chronic Hypoglycaemia in Trichiniasis.**]—*Wien. Klin. Woch.* 1942. Oct. 9. Vol. 55. No. 41. pp. 807–809.

This paper is reviewed in *Bulletin of Hygiene*, 1943, Vol. 18, p. 384.

GOULD (S. E.). **Immunologic Reactions in Subclinical Trichinosis.**—*Amer. Jl. Hyg.* 1943. Jan. Vol. 37. No. 1. pp. 1–18. With 2 figs. [31 refs.]

This paper is reviewed in *Bulletin of Hygiene*, 1943, Vol. 18, p. 471.

DEFICIENCY DISEASES.

BOEHRER (John J.), STANFORD (Charles E.) & RYAN (Elizabeth). **Experimental Riboflavin Deficiency in Man.**—*Amer. Jl. Med. Sci.* 1943. Apr. Vol. 205. No. 4. pp. 544–549. [14 refs.]

The authors quote SEBRELL and BUTLER—" at the present time it seems that superficial vascular keratitis is the earliest and most

common visible manifestation of riboflavin deficiency as well as a rather reliable index of early deficiency of the B group of vitamins." To test this they subjected three volunteers to a diet low in riboflavin, while to three controls on a full diet extra riboflavin was given. The experiment lasted 35 days.

They expected to see corneal vascularization appear in accordance with the statement by SYDENSTRICKER, KELLY and WEAVER—"Under experimental conditions within a few days, often only two, empty capillaries can be seen arising from the apices of the loops outlining the scleral projections . . . in two or three days more they form complete loops through which red cells circulate irregularly and in clumps." Boehrer and his colleagues were, however, disappointed—nothing happened except in one of the controls who developed a "few streamers off nasal limbus, left eye." A week later "additional capillary extension from nasal limbus, both eyes."

[The authors appear to realize some of the pitfalls associated with work of this kind. There are many variations which probably should be considered as coming within normal limits. This has been impressed upon the mind of the reviewer during some thousands of slit-lamp microscopies.] *H. S. Stannus.*

YOUMANS (J. B.), PATTON (E. W.), ROBINSON (W. D.) & KERN (Ruth). **An Analysis of Corneal Vascularization as found in a Survey of Nutrition.**—Reprinted from *Trans. Assoc. Amer. Physicians.* 1942. Vol. 57. 6 pp. With 1 fig. [Summary appears also in *Bulletin of Hygiene.*]

The authors open by stating that "Although there is little doubt that it [corneal vascularization] can be caused by a lack of riboflavin and that this vascularization can be distinguished from that due to certain other causes, some doubt has arisen concerning its specificity and therefore its reliability as a sign of riboflavin deficiency." The authors' analysis covers 1,200 subjects, 30 per cent. of whom were negro, the entire population of a rural area in Tennessee, on whom 500 slit-lamp examinations were made. They divided their cases into two grades—positive and negative—and include in the former "only those in which the invasion has taken place throughout the perimetry of the lower nasal and temporal quadrants. In addition the vascularization must have clearly extended well into the anterior portion of the cornea."

Seventy-three subjects were admitted into the positive group, the vessels in most instances being "filled with circulating blood." "In only 15 per cent. of the group were less than one-third of the invading vessels filled with blood."

This "positive" group was compared with a "control" group of 121 subjects who showed no vascularization. There was no essential difference in respect of age or sex but a striking difference in racial distribution—hardly any negroes were affected, a finding which remains unexplained.

Between the positive and control groups no significant difference was found in relation to riboflavin intake, riboflavin-calorie ratio, or other dietary factor, nor was there any correlation with sociological features or various laboratory tests. The only significant difference was in the medical history and physical examination. In 29 per cent. of the positives, in contrast with 9 per cent. of the controls, "infected sclera"

[undefined] occurred, asthenopia was more common but there was no difference in frequency of photophobia, sore tongue or lip lesion in the positive group. None showed the frank signs of ariboflavinosis. The authors conclude: "The results of this study indicate, first, that corneal vascularization as observed by us, bears no clear relationship to the dietary intake of riboflavin, nor to other evidence of riboflavin deficiency; second, that it occurs much more frequently in white subjects than in negroes; third, that there was a marked regression in the incidence and degree of vascularization in 15 subjects over a period of the winter months." The authors suggest that the dissociation of these ocular lesions from oral and other lesions may be due to a minor riboflavin deficiency being revealed in the cornea only, owing to a second factor, namely visible or U-V light which destroys riboflavin locally. *H. S. Stannus.*

SHELLEY (Horace M.). **Pellagra.**—*East African Med. Jl.* 1943. Mar. Vol. 20. No. 3. pp. 68–82. [12 refs.]

SPRUE.

ADLERSBERG (David) & SOBOTKA (Harry). **Influence of Lecithin Feeding on Fat and Vitamin A Absorption in Man.**—*Jl. Nutrition.* 1943. Mar. 10. Vol. 25. No. 3. pp. 255–263. [10 refs.]

Present availability of commercial lecithin has rendered this study possible with a view to improving fat absorption in the treatment of sprue and coeliac disease.

As standard procedure the fat tolerance test of NISSEN, modified by KANN & SOBOTKA, was adopted. This test determines total serum lipids at intervals after ingestion of butter fat, 1 gm. per kilo. after a twelve-hour fast. The maximum rise of the total lipids in the blood occurs between the fourth and fifth hour after ingestion. The lipid content of the serum in the control group varied, with fluctuations from 275 to 895 mgm. per cent. In the gastro-intestinal group (sprue, jejuno-ileitis, intestinal tuberculosis) the average was slightly lower with a range of 165 to 550 mgm.

Fat tolerance tests were performed on controls and on persons with active sprue. The total lipid content of the serum in the controls showed an increase of 59 per cent. four hours after ingestion; in the sprue group the content remained practically unchanged.

The third group, consisting of three typical cases of sprue, was examined, after prolonged treatment with liver extracts and vitamins, during remission and the total serum lipids increased 53 per cent. after the fat tolerance meal, thus indicating a more satisfactory fat absorption.

The addition of 10 to 15 gm. of commercial lecithin, spread on cakes, was studied. The fat absorption was thereby increased in every control case, the average being raised from 32 to 71 per cent. In three cases of sprue this addition resulted in moderate absorption, averaging 27 per cent. After establishing the vitamin A and carotene content in the serum of controls and in cases of gastro-intestinal disease, the vitamin A tolerance test was instituted. This consists of the determination of the vitamin A content of the serum in the fasting individual and at frequent intervals after the ingestion of a test dose

of vitamin A. Most tests were done with 3 cc. of percomorph oil (1 cc. equals 60,000 I.U. of vitamin A). The maximum rise of vitamin A in the blood is found four hours after ingestion ; it thus parallels fat absorption.

Again controls were employed—eighteen more patients convalescing from various internal diseases and twelve suffering from various gastro-intestinal manifestations. The lowering of vitamin A and carotene contents in gastro-intestinal and liver disease was striking and indicated vitamin A deficiency caused by diminished food intake and impaired intestinal absorption.

The vitamin A tolerance test was carried out in control cases and in sprue. In seven individuals who ingested 90,000 to 180,000 I.U. of vitamin A the group average vitamin A content of the blood rose 41 per cent. in four hours, but the carotene content remained unchanged ; in two cases of sprue, however, after ingestion of a similar amount of vitamin A no rise took place, thus demonstrating the inability of patients with sprue to absorb fat-soluble vitamins.

The effect of lecithin was also studied, vitamin A tolerance tests were performed with and without the addition of 9 to 12 gm. of commercial lecithin. When lecithin was given, the vitamin A content rose to 212 per cent. ; when lecithin was not given the content rose to 41 per cent. only. There also occurred a moderate elevation of the carotene content of the blood when lecithin was given. Hence it is concluded that the addition of lecithin apparently promotes absorption of vitamin A in a mannner similar to that of fat absorption.

Commercial lecithin represents the natural product of soya bean phosphatids with approximate content of 20 per cent. lecithin plus 30 per cent. soya oil. It was considered necessary to study the effect of lecithin on vitamin A and carotene contents of the blood without the addition of vitamin A. Four tests were made in which the vitamin A and carotene were examined in fasting specimens and four hours after the administration of 12 gm. of commercial lecithin. In three there was a moderate increase, whilst in the fourth an actual decrease. The average percentual increase was 8, which may be due to mobilization of vitamin A in depots in the liver. *Philip Manson-Bahr.*

HAEMATOLOGY.

DURAN-JORDA (Frederic). **Formation of Red Blood Corpuscles.**—*Lancet.* 1943. Apr. 24. pp. 513–514. With 5 figs.

Observations are described which lead the author to believe that the red blood corpuscle is formed from the plasma cell by a process of secretion when the plasma cell disintegrates. In his view the red blood corpuscle is a simple droplet of colloidal nature, in some respects similar to the fat globules in milk, while the accepted lymphocyte is really a stage in the development of the normoblast. The platelets, he considers, are protoplasmic remnants of the original plasma cell which has broken up. All currently accepted theories, concerning agglutination of red blood corpuscles, it is suggested, should be revised on the basis of the laws of colloidal chemistry since the red blood corpuscle, in the author's opinion, obeys the general laws of colloidal suspensions.

Janet Vaughan.

OGDEN (M. A.). **Sickle Cell Anemia in the White Race with Report of Cases in Two Families.**—*Arch. Intern. Med.* 1943. Feb. Vol. 71. No. 2. pp. 164–182. With 8 figs. [11 refs.]

Four examples of the sickling trait in a family of Spanish descent and five in a family of German descent, the first reports of the condition in persons of these nationalities, are described, and the hereditary transmission established. In the first family the mother had transmitted the sicklaemic trait to all her three children, to one in an active form. In the second family all four children, again one in an active form, had inherited the mother's trait. At the same time the three sons inherited their father's blood group (A). In the German family a negro ancestry was proven and the author believes that in all white persons with the sickling trait an admixture of negro blood has occurred in the immediate or remote ancestry; almost all the previously reported cases in white persons have been people of Mediterranean origin. Investigating the incidence of the condition in New Orleans the author found among 692 negroes, 5 males and 2 females with active sickle cell anaemia, and 3 males and 35 females with sicklaemia (immediate and delayed), the total incidence of the sickling trait being, therefore, 6·5 per cent. There was not a single case of the sickling trait found in 910 white persons examined. It was remarkable that of the 37 females showing the sickling trait only 2 (5·4 per cent.) had an active sickle cell anaemia, whereas of the 7 males the corresponding figure was 5 (71·4 per cent.). Any sicklaemic person is a potential bearer of sickle cell anaemia, and as few with the active condition survive beyond the third decade of life, intermarriages between negroes and whites may directly endanger the white race. In order to determine the racial incidence of the condition the author recommends, as part of every routine blood examination, the observation of a moist preparation of whole blood, if necessary for not less than 48 hours at room temperature.

F. Murgatroyd.

STASNEY (Joseph). **Erythrophagocytosis and Hemosiderosis in the Liver and Spleen in Sickle Cell Disease.**—*Amer. Jl. Path.* 1943. Mar. Vol. 19. No. 2. pp. 225–237. With 6 figs. on 2 plates. [20 refs.]

Abnormal destruction of erythrocytes by the reticulo-endothelial cells is characteristic of many haemolytic anaemias. Although gross morphological evidence of erythrophagocytosis is uncommon, it is seen occasionally in pernicious anaemia, haemolytic jaundice, icterus gravis neonatorum, Weil's disease and sickle cell disease. The spleen usually shows few phagocytosed erythrocytes, these being mainly found in the Kupffer cells of the liver. Among 4,094 autopsies at the Charity Hospital, Louisiana, in three years there were 12 cases of sickle cell disease. In seven the spleens were normal in size or enlarged (average weight 286·4 gm.) and the livers were normal or moderately enlarged (av. wt. 1,705 gm.), while in the remaining five cases the spleens were small (av. wt. 19·7 gm.) and the livers were normal or markedly enlarged (av. wt. 2,106 gm.). The normal ratio of hepatic to splenic weight is 9·3 to 1; in the first group of sickle cell disease it was normal or slightly raised but in the second it was very high. The livers were usually enlarged, reddish-brown and firm. Histologically there

was congestion, the sinusoids were distended and filled with sickled cells; the Kupffer cells were swollen and showed varying degrees of erythrophagocytosis. The liver cords were regular, the parenchyma cells compressed, slightly swollen and granular; infrequently there was some lipoidosis. The spleens in the first group showed congestion of sinusoids and venous sinuses which were filled with sickled cells; the lining cells of the sinusoids were thin and irregular. The central arteries were dilated and the follicles were without germinal centres. Iron pigment was variable. The reticulum was a thickened fibrillar network with deposits of haemosiderin. Small haemorrhages and infarcts were present. In the second group the spleens were fibrotic, there was an increase in the hyaline connective tissue and widening of the trabeculae, with deposits of pigment. The walls of the sinusoids, which were filled with distorted erythrocytes, were thickened and the endothelial cells were flattened; erythrophagocytosis by the sinus endothelium was minimal. The follicles were inconspicuous and without germinal centres. Summing up, varying degrees of erythrophagocytosis are found in sickle cell disease, the Kupffer cells most frequently showing engulfed cells and the splenic reticulum only occasionally. No direct correlation was found between erythrophagocytosis and coexisting infection. *F. Murgatroyd.*

EPIDEMIC DROPSY.

SARKAR (S. N.). **A Sensitive Chemical Test for the Detection of Argemone Oil. Part II. The Specificity of the Test.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1942. Vol. 2. No. 2. pp. 101–102.

The author, in 1941, described his ferric chloride test for Argemone oil [see this *Bulletin*, 1942, Vol. 39, p. 711] and compared it with the nitric acid test of LAL and his fellow-workers [this *Bulletin*, 1939, Vol. 36, p. 910]. In order to study the specificity of his ferric chloride test the author examined fourteen samples of vegetable oils, many of which—for example, linseed oil, Mahua oil, Niger seed oil, Safflower seed oil, sesame oil, olive oil, jute seed oil, tamarind oil, radish oil, among others—are common adulterants of the mustard oil of commerce. Nine of them—the nine named in the foregoing—gave a positive to Lal's test, but all were negative to Sarkar's ferric chloride.

H. Harold Scott.

VENOMS AND ANTIVENENES.

PETERSON (H.) & KÕIVASTIK (Th.). Von der Toxität des Kreuzotternsera (Vipera berus berus-) Serums und seinen antitoxischen Eigenschaften bezüglich homologer und heterologer Schlangengifte. [**The Toxicity of Viper** (*V. berus berus*) **Serum and the Antitoxic Properties of the Serum against the Venoms of this and other Snakes.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1942. Dec. 10. Vol. 102. No. 5. pp. 324–331.

The blood or the serum of venomous snakes is known to be toxic to experimental animals. Madame PHISALIX and CAIUS studied the sera

of 30 snakes belonging to several different genera and found them to cause local and general reactions which might end fatally. The author has tested the sera from large numbers of vipers, from Esthonia, on rabbits, guineapigs, white mice and pigeons, under four conditions: (1) *Injected fresh* (the blood was collected and kept for one to two days at 2°C., and the serum was then separated and kept at 2°–4°C.). Injected intravenously into rabbits, 4 cc. caused death in 24 hours, 2 cc. caused symptoms but were not fatal; 1 cc. killed pigeons in 12 hours, 0·5 cc. had no effect; 4 cc. subcutaneously killed guineapigs in 12 hours and 0·1 cc. intravenously killed white mice in the same time. Clearly then the serum is toxic in small doses, fatal in large doses. (2) *After being kept in the refrigerator for a year* (at 2°–4°C.). The serum seemed no longer to possess toxic properties. (3) *After heating at 56°C. for 15 minutes.* No toxicity. (4) *After passage through a Seitz filter.* The toxicity was practically equal to that of the fresh serum, but the results would vary in a way not explained. Generally, the results were the same as those in Exp. 1, but, whereas 0·25 cc. caused no symptoms in mice, 0·1 cc. caused death in 24 hours.

The authors next proceeded to test whether the toxin of the serum was neutralized by viper antivenene prepared in horses. They injected white mice with a mixture of 0·1 cc. of the antivenene and varying doses, 0·4–0·1 cc., of the fresh viper serum. The mixture was every bit as toxic as the fresh serum alone; in other words the fresh serum contains toxins not neutralized by antivenene.

Their next study was to test the neutralizing power of the serum of *V. berus berus* against its own venom, and, using white mice as before, they found that 1 cc. of the serum would neutralize 0·39 mgm. of the homologous venom, but had no action against the venoms of other species, *V. aspis* and *V. ammodytes*. [An interesting study.]

H. Harold Scott.

MOLL (Arístides A.). Prevención y tratamiento del ofidismo. [**Prevention and Treatment of Snake-Bite.**]—*Bol. Oficina Sanitaria Panamericana.* 1942. Nov. Vol. 21. No. 11. pp. 1084–1088. English summary.

In an article so brief as this the information given is necessarily very condensed; at the same time it is very complete in the statement of the principles to be adopted. About 75 per cent. of bites are on the legs and feet, some 22 per cent. on the hands and arms, and only 3 per cent. on the trunk; hence it is well to travel in leggings and thick shoes and to wear long hip-boots when it is necessary to wade through swamps. Also, since snakes hide in crevices or along dead branches of trees, it is always advisable, when climbing rocks for example, to test with a stick the places where one is about to place the hands.

The author goes on to enumerate the symptoms of snake-bite; these need not be repeated here. He describes in detail the lines to be followed in treatment. At first a tourniquet which, if risk of gangrene is to be avoided, should be loosened for half a minute every 20 minutes or so. Next, cross-incisions of about a quarter of an inch and as deep as the penetration of the fang at each site bitten, followed by aspiration by a rubber instrument, like a breast-pump for example. As the swelling increases similar incisions should be made at the periphery and more suction applied, for 20 minutes each hour. Serum secretion is

aided by fomentations of magnesium sulphate or citrate, with alternating applications of perchloride of mercury, 1 : 10,000, to keep the wound aseptic. Antivenene, if available, is best applied subcutaneously near the bite and around it at one-hour intervals, to form an area of defence to which the poison is tending to spread. Large quantities may be needed. The lethal dose of the venom of the North American viper is calculated to be 25 mgm. for a man of 120 lb. (8½ stone), and the Texan Crotalus may inject 10 times this, and rarely as much as 1,000 mgm.

The author cautions against the giving of alcohol and against running because these increase the heart's action and promote absorption and dispersion of toxin. He is also averse to the local use of potassium permanganate on account of its injuring the tissues. He mentions Drs. HARRISON and Dudley JACKSON of San Antonio as favouring the treatment by incision and suction and the wrapping in hot magnesium sulphate dressings to increase exudation. *H. Harold Scott.*

SCHÖTTLER (W. H. A.). Die Grenzen der Serumtherapie bei Bissen afrikanischer Giftschlangen. [**The Limits of Antivenene Treatment of Bites by Poisonous Snakes of Africa.**]—*Deut. Trop. Ztschr.* 1943. Feb. 15. Vol. 47. No. 4. pp. 81–91. [30 refs.]

The author tested the effects of antivenenes from six sources against the poisons of eleven species of snakes. The snakes were: *Haemachatus haemachatus* (2), *Dendroaspis viridis*, *Naja haie*, *N. nivea*, *N. melanoleuca*, *Bitis lachesis*, *B. gabonica*, *B. nasicornis*, *Aspis cerastes* and *A. aspera*. The antisera obtained were: (1) Against West and Central African species of Haemachatus and Bitis. (2) Against several African Colubridae and Viperidae [not specified]. (3) Against Indian and Egyptian cobras. These three were from the Pasteur Institute in Paris. (4) A concentrated serum prepared from horses immunized by formol-toxoid of *N. nivea* and *B. lachesis*, from the South African Institute for Medical Research, Johannesburg. (5) Puff-adder antiserum. (6) Cobra antivenene. Both these were from the Behringwerke, Marburg.

Mice were used as experimental animals; the toxin and antivenene were mixed and kept at 37°C. for half an hour before injection. [It is unlikely that in the field an antivenene could be obtained so soon.] The question of the limits of antivenene therapy, as posed in the title, is almost unanswerable, because the amount of venom injected under natural conditions is very uncertain and the time which elapses between the injury and the use of the serum is very variable. These points are not considered sufficiently in the present article. The amounts of venom have been estimated as: Dendroaspis 100 mgm., Haemachatus 240 mgm., *Naja nivea* 250 mgm., *Naja haie* 700 mgm., *Bitis lachesis* 750 mgm., *B. gabonica* 1,000 mgm. or more. [These are the figures given by GRASSET, ZOUTENDYK and SCHAAFSMA at the Royal Society of Tropical Medicine and Hygiene in 1935.] *H. Harold Scott.*

DERMATOLOGY AND FUNGOUS DISEASES.

BLOMFIELD (D. M.). **Prickly Heat.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1943. Jan. 30. Vol. 36. No. 4. pp. 239–246.

In this excellent paper the author makes the point that prickly heat and its sequelae may be far more than an irritating but rather trivial nuisance. He has found it in such severe forms as to affect materially the fighting strength of Army units. The severe forms were seen at Assab in Eritrea, especially in the months of July and August.

He divides prickly heat into five types: (1) Miliaria, the common form. (2) Multiple boils, which are included because of a special form, seen in association with the usual rash, in which slowly developing, painful blisters appear on the fingers, beginning as deep-seated whitish swellings. When the exudate is evacuated, the skin peels away from a larger area than the original lesion, leaving a red, raw surface; no deep lesions were seen. (3) The impetiginous rash, also a concomitant of the common rash, and found at the alae of the nose or on the chin. (4) The pemphigous form, in which symmetrical crops of blebs and bullae appear in the axillae and groins. These are very painful, spread rapidly and are laxly filled with thin pus. This form may go on to (5) the pustular form with fungous infection, when the bullae become angry-looking pustules with black centres, probably due to growth of a fungus.

Aetiology is discussed, and it is noted that the diet of the men in this region was deficient in vitamins, so much so that cases of avitaminosis were seen. The author does not believe that prickly heat is due to a fungus, but attributes it to dysfunction, through overaction, of the sweat glands, leading to blockage of the ducts followed by swelling, with congestion and rupture of the capillaries of the glands. The finger blisters may be due to introduction of bacteria through minute abrasions; the facial condition is probably caused by a low-grade coccal infection of a cut, and is probably not connected with overaction of sweat glands. The blebs and bullae of the pemphigous type are probably due to breakdown of the special, large coil sweat glands which are found only in the axillae and groins. The openings of the ducts of these glands are deep in the walls of the hair follicles. The author states that in the atmospheric conditions of Assab these glands also excrete part of their own living cells and that the intense activity they are compelled to undergo results in blockage and accumulation of dammed-up fluid. Blockage of groups of glands may give rise to bullae as large as a thumb nail.

There are, therefore, two main forms of reaction of the skin to severe climatic conditions: (1) the miliary rash due to dysfunction of the small sweat glands, and (2) the pemphigoid condition due to dysfunction of the large sweat glands. The other clinical conditions are due to invasion of bacteria or fungi. The author suggests the name "climatic hyperidrosis" to replace prickly heat or lichen tropicalis.

Treatment includes as much avoidance of sweating as may be possible, bathing, the wearing of as few clothes as possible, the scrupulous cleanliness of all garments, and the constant use of a towel to mop up sweat. The intake of fluid may be somewhat restricted, since as a rule too much is taken for actual replacement needs; the diet should be adequate in fresh foods. A lotion of zinc oxide 30 gm.

menthol 2 gm., alcohol 160 gm. and water 40 gm., as used by the Italians, was useful to allay irritation. For pemphigous lesions a simple powder was used, and for the impetiginous condition an Italian ointment which probably contained chrysophanic or salicylic acid. The rate of improvement in patients remaining under the climatic conditions which brought on the affection is slow; in severe cases transfer to a cool climate must be considered.

[The author's views on the aetiology of prickly heat are sound; they agree in essential with those of SIMONS, who has studied the conditions in the Netherlands East Indies (see this *Bulletin*, 1941, Vol. 38, p. 732).] *C. W.*

KESSLER (Ad.). Behandlung und Vorbeugung des Lichen tropicus. [**Treatment and Prevention of Lichen tropicus (Prickly Heat).**]—*Deut. Trop. Ztschr.* 1943. Feb. 15. Vol. 47. No. 4. pp. 92–94.

There is no need to enlarge upon the inconvenience, the curse, of prickly heat to readers of this *Bulletin*. The number of vaunted cures is legion; many contain solutions of salicylic acid in spirit, or acetic acid preparations, or talcum powder with salicylic acid or thymol, or are in the form of medicated soaps. At times all seem to fail and some seem merely to irritate further a tender inflamed skin.

The basic principles should aim at relieving the itching and burning sensation, drying up the vesicles, neutralizing the skin secretion, and at disinfection. The author has used the following for more than fifteen years:—

Menthol	0·5 gm.
Bismuth. subgall ...	5·0 ,,
Zinc. oxid. pulv. ...	20·0 ,,
Acid boric pulv. ...	10·0 ,,
Talc. venet. pulv. ...	100·0 ,,

The whole is to be in a very fine powder and passed through a small-meshed hair-sieve. After the patient has taken a quick warm bath, the powder is to be dusted on the parts involved. Many take cold baths because they cool the inflamed skin, but they are bad because the irritation is subsequently increased thereby. Those who are subject to the "red dog" (the German term for prickly heat) are advised to use the powder regularly. Without the menthol it is serviceable as a "baby powder"; the menthol is omitted because the infant may convey it to its eyes.

The author gives also a formula for an ointment preparation, which he strongly recommends if furuncles have been produced. These should not, in his opinion, be opened but the following ointment applied:—

Hydrarg. praecip. alb. pulv. ...	10 gm.
Balsam peruv.	5 ,,
Acid. boric. pulv.	
Zinc. oxid. pulv.	āā 10 ,,
Vasel. flav.	ad 100 ,,

The precipitated mercury must be very finely powdered; this may be tested by rubbing a little of the ointment on the back of the hand,

when no gritty particles should be perceptible. The ointment is applied to the inflamed area and the part bandaged; the application is to be renewed in 24 hours. As a rule, in three days the purulent foci have joined up and are easily removed by drawing on the superficial layers of the skin from the centre to the periphery. For the next two days after removal of the pus a thin layer of the ointment should be applied and covered with a light bandage to keep the surface clean.

H. Harold Scott.

ALPINS (O.). **Pyoderma Ulcerosum Tropicalum.**—*Med. Jl. Australia.* 1943. Jan. 9. 30th Year. Vol. 1. No. 2. pp. 30–31. With 1 fig.

The condition described is common in the Northern Territory of Australia in the hot and damp season. The author has seen some 300 cases. An eruption starts usually at the site of an abrasion of a scratched insect-bite on some exposed part, but not on the face or neck. After a few hours vesicles appear, discrete, with surrounding inflammation. The vesicles break to discharge a straw-coloured fluid and leave ulcers with thickened margins. This crusts over and the ulcer extends and deepens beneath it. The infecting organism appears to be a haemolytic streptococcus, at times associated with *Staphylococcus aureus.* Prevention is best attained by wearing long trousers and long-sleeved shirts. The best local treatment was found to be painting lightly with 50 per cent. carbolic acid, then cleansing with saline solution and applying Whitfield's ointment [benzoic acid 5 per cent. and salicylic acid 3 per cent. in white soft paraffin and coconut oil]. After the discharge ceases, zinc cream with acriflavine (1 in 1,000) is used daily till healing is complete. Sulphapyridine ointment was also found useful. [May we hope that it is not too late to protest against the title of this paper, or rather against the name here given to the disease? There is no such Latin word as "tropicalum" and Smith Minor would be caned, and rightly, for concocting it.]

H. Harold Scott.

BEERMAN (Herman). **Pinta—a Review of Recent Etiologic and Clinical Studies.**—*Amer. Jl. Med. Sci.* 1943. Apr. Vol. 205. No. 4. pp. 611–623. [80 refs.]

This review of recent advances in the study of *Mal del Pinto* is the outcome of a fourfold purpose. First, because many good articles on the subject are not available to the medical public in general; second, because many United States soldiers are, or may be, stationed in districts where the disease is common and they may return infected; third, because of the recent determination of its aetiology; and fourth because of its theoretical interest as another spirochaetal infection. The author treats of the geographical distribution, the aetiology and transmission of pinta, its epidemiology, clinical manifestations, serology and treatment. Most interesting is the relation to other spirochaetal diseases; how that the Wassermann reaction is positive in 60 to 100 per cent. of cases according to the stage, that syphilis does not confer immunity to pinta, nor does one attack protect against a second. [An altogether excellent account of the condition.]

H. Harold Scott.

FERREIRA (L. A.). Problemas de micologia médica em Moçambique. [**Problems of Medical Mycology in Mozambique.**]—*Bol. Soc. Estud. Colón. Moçambique.* 1941. Vol. 10. No. 44. pp. 33–64. With 7 figs. [Summary taken from *Rev. Applied Mycology.* 1943. Apr. Vol. 22. Pt. 4. p. 137.]

This is a comprehensive account of the etiology, geographical distribution, mode of infection, pathological anatomy, clinical development, diagnosis, and therapy of sporotrichosis, associated in Mozambique with *Sporotrichum schenckii.* The paper includes keys to the family Sporotricheae and the genus *Sporotrichum* and an explanatory survey of the application of Beijerinck's auxanographic method of identification to the yeasts.

i. CASTRO PALOMINO (J.) & ALFONSO Y ARMENTEROS (José). Los micetomas. Revisión de las investigaciones micológicas practicadas en Cuba. [**The Mycetomas. A Review of Mycological Investigations in Cuba.**]—*Rev. Med. Trop. y Parasit.* Habana. 1942. Mar.–Apr. Vol. 8. No. 2. pp. 20–27. With 2 figs.

ii. FUENTES (César) & JOSÉ ANGULO (Juan). Una nota aclaratoria en la polemica sobre la identidad de un actinomyces madurae identificado por el Dr. Pedro Domingo y descripto por los doctores Oteyza, Ramirez Corria y Armas. [**Explanatory Note on the Identity of** *Actinomyces madurae.*]—*Ibid.* Sept.–Oct. Vol. 8. No. 5. pp. 67–68. [10 refs.]

i. The existence of mycetoma in Cuba has been known since the beginning of the present century. In 1901 ALBERTINI and DESVERNINE reported two cases of maduromycosis; in 1910 Gomez MURILLO recorded the first case of alveolar actinomycosis in an ox and stated that he had recognized it clinically four years before. In 1917 RODRIGUEZ reported a human case of actinomycosis, but this, state the authors, was incompletely studied and they award priority to STINCER, who reported a case of pulmonary actinomycosis in 1925.

The authors then give a general account of the mycetomas, mostly referring to the literature and adding cursory remarks regarding the appearance and cultivation, and classification. They follow in the main the classification of CHALMERS and ARCHIBALD into the groups Actinomycoses and Maduromycoses. They have tried repeatedly to cultivate the organism on various media, but up to the present without success.

ii. The writers of this note discuss in detail one of the cases to which the authors of the preceding article have referred. They point out that there is no satisfactory classification of this group of fungi at present, as different authorities use different criteria as bases for classification. They stress the need for "standardizing" methods of studying them, so that results obtained by investigators may be compared and that, in consequence, a more orderly arrangement may develop out of the present chaos. [There is much in what the writers of this note affirm.]

H. Harold Scott.

SIMSON (F. W.), HARINGTON (C.) & BARNETSON (J.). **Chromoblastomycosis: a Report of Six Cases.**—*Jl. Path. & Bact.* 1943. Apr. Vol. 55. No. 2. pp. 191–198. With 13 figs. on 3 plates.

This paper gives details of six cases detected in the Union of South Africa. Four of the patients were natives, mostly of local tribes;

two were East Indians. All had lesions in the region of the ankles and all the lesions were of the verrucous type, one being flatly papillomatous whilst all the others were frankly cauliflower-like. In only one man was there a history of earlier injury at the site of the disease. The diagnosis was confirmed microscopically on each occasion but in only two cases were cultures made. In one of these the fungus had the characters of *Hormodendron pedrosoi*, showing hyphae with pseudo-acrothecal sporulation. The other culture still awaits classification but showed hyphae with lateral conidiophores. All the illustrations, particularly those of the microscopic features presented by the fungi, are excellent. *Sydney Thomson.*

MISCELLANEOUS.

SMART (A. G. H.). **Some Medical Problems in the Colonies in Wartime.** —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1943. May. Vol. 36. No. 6. pp. 319–334. Discussion pp. 334–338 [BLACKLOCK (D. B.); RICHARDSON (D. T.); SMITH (Hugh); HACKETT (C. J.)].

This address is a brief statement of the medical problems of the Colonies as they are affected by the war. The difficulties created have been great. Staff has been reduced; for instance, in Africa, about one-quarter of the medical officers have been released for military service, and many of these were officers with specialist qualifications. There has been much traffic through the Colonies, and much opportunity for the transmission of tropical diseases to the newcomers.

Yellow fever has been a preoccupation of the medical authorities of Africa, and its control, fortunately on the safe basis of preventive vaccination, has needed organization on a wide scale. Endemic areas have been defined, and the recommendations of the Interdepartmental Committee's Report on the public health problems of aerial travel have been largely adopted. In all matters concerning vaccination the great help of the Rockefeller Foundation, the Wellcome Research Institution and, more recently, the South African Institute for Medical Research, is acknowledged.

Malaria in Africa is, in the main, the problem of *Anopheles gambiae* and its variety *melas*. So much has long been known, but in the face of war-time developments, a Mission consisting of Professor D. B. BLACKLOCK and Dr. Carmichael WILSON was appointed to examine the situation in Freetown. Further work is now being done on the essential study of the biology of these mosquitoes by Dr. R. C. Muirhead THOMSON, who has done much to elucidate the habits of *A. minimus* in Assam. The danger of malaria to troops, and to others whose movements are dictated by war-time needs, has led to the taking of measures of prevention which are of a temporary nature, but these will eventually merge into the permanent control organization of peace.

Brief accounts were given of tuberculosis, typhus, venereal disease, cerebrospinal fever, tsutsugamushi and tsetse control, and the problem of nutrition was discussed. As a result of war stimulus, many colonies have become self-supporting, and the policy outlined in the STOCKDALE report should go far towards relieving the situation of general health in the West Indies.

The future medical policy of the Colonies will ensure that medical advances will not be limited by the revenue of each territory. The Development and Welfare Act will make available funds for expansion on a greater scale than ever before, and this expansion will be based upon the statement of Medical Policy drafted by the Colonial Advisory Medical Committee and accepted in principle by the Secretary of State.

In the discussion Professor D. B. BLACKLOCK emphasized the importance of unification of control of mosquito-borne diseases, and of housing, in relation to tropical hygiene. Major-General D. T. RICHARDSON reported excellent results from the use of the belts designed by Professor P. A. BUXTON for the control of lice. Dr. Hugh SMITH spoke of the work of the Rockefeller Foundation, and pointed out that the Royal Society of Tropical Medicine and Hygiene is in a position to stimulate interest in tropical medicine. Wing-Commander C. J. HACKETT remarked on the assistance which had been given to the Royal Air Force by the Colonial Medical Service, but drew attention to the disparity of practice with regard to malaria prevention in East and West Africa. *C. W.*

COLONIAL OFFICE. **Development and Welfare in the West Indies 1940–1942.** Report by Sir Frank STOCKDALE, K.C.M.G., C.B.E. (Comptroller for Development and Welfare in the West Indies). Colonial No. 184.—pp. iv+93. 1943. London: H.M.S.O. [1*s.* 6*d.*] [Summary appears also in *Bulletin of Hygiene.*]

This report should be in the hands of all persons interested in the welfare of the West Indies. Prominence is given to the section on public health, in which the suggestion is made that the Health Unit system, long known in Ceylon and Mauritius, should be developed. Various suggestions are made for the control of the prevalent diseases and for the organization of medical services, but it is clearly emphasized that good health is related not only to medical care, but also to agriculture and industry, economics, social welfare and education. *C. W.*

ELSDON-DEW (Ronald). **A Pathologist's Abyssinian Notes.**—*South African Med. Jl.* 1942. Dec. 12. Vol. 16. No. 23. pp. 416–417.

These are interesting notes; they reveal the vast amount of medical work which is needed in Abyssinia.

The author claims that there are three, if not four, forms of typhus: epidemic louse-borne typhus is general in the colder areas, and exacerbations occur in cold weather; the murine form is always to be found; a tick-borne variety has been seen at Adama, but the author doubts its identity with South African tick-bite fever since there was apparently no cross immunity in one person who had experienced both diseases; there is a suggestion of a fourth form in cases of typhus-like fevers in which *Proteus OXK* is strongly agglutinated. The incidence of typhus in British and Imperial troops was infinitesimal compared with that in Ethiopians and Italians.

Malaria is not found in Addis Ababa and the mountain zone, but *P. vivax* is found in what the author describes as the highland zone, and *P. vivax* and *P. falciparum* in the lowlands; other malaria parasites were not seen. Shiga and Flexner forms of dysentery occur, and enteritis due to a bacterium of the Morgan type has been seen, but

amoebiasis is apparently not a common disease. Typhoid is common in the inhabitants.

No case of yellow fever was seen, but a case of leptospirosis was found in the west; the Italians and Germans report completely negative results from surveys for yellow fever protective bodies. Kala azar is found near Lake Rudolph.

Venereal diseases are rampant, including soft sore, lymphogranuloma inguinale and granuloma venereum, but gonorrhoea and syphilis are the most important; yaws is widespread.

Relapsing fever presents problems which require elucidation. Except in Somaliland it is almost entirely louse-borne, and the author is convinced that there are several strains of the spirochaete. One feature is the agglutination of *Proteus XK* in high titre (1 in 1,600), but all cases of relapsing fever do not show this. Nevertheless, the reaction was not found in control sera taken for the Kahn reaction or in sera from patients with malaria. In positive cases there is progressive rise in titre, and while the rise continues, relapses may be expected. On the other hand, relapses may take place in patients who have no agglutinins. The reaction was never positive in fatal cases; patients who showed a positive result reacted to arsenicals.

In general, relapsing fever was very severe, icterus was frequent, and in certain outbreaks mortality was high, even with arsenotherapy. [The frequent occurrence of icterus may lead to confusion with yellow fever, a difficulty realized by FINDLAY *et al.* in the Sudan, where an epidemic of yellow fever was accompanied by outbreaks of relapsing fever and infective hepatitis; see this *Bulletin*, 1942, Vol. 39, p. 457.]

C. W.

BLOSS (J. F. E.). **Notes on the Health of the Sudan prior to the Present Government.**—*Sudan Notes and Records.* 1941. Vol. 24. pp. 131–143.

This article is based on an address to the local, Sudan, branch of the British Medical Association, 7 years ago. It is a pity that the publication has been so long delayed, for at the present time few will have the leisure to read an account full of information and interest, and there is a fear, even a likelihood, that, when the present stress is over, it may have again been relegated to oblivion. The author tells of the conditions in medical matters prior to the founding of the Kitchener School of Medicine and the establishment of a modern Medical Service. The information has been gleaned—the author does not claim that the material for his notes is original—from the reports of travellers, James Bruce (1765–1777), W. G. Browne (1793, but his book was not published until 1806), Burckhardt (1819), Baker (1866), and Schweinfurth (1871). Malaria, dysentery, smallpox, venereal diseases and trachoma were rife, leprosy, guineaworm, enlarged spleen and liver (possibly from schistosomiasis) fairly common, and what is called "plague," but which the author believes to have been typhus or cerebrospinal fever. Baker reports that 15,000 died of plague at Khartoum in 1866. From the description it resembled typhus and was certainly not bubonic plague. Measles also was very fatal and greatly feared. More than 10 per cent. of children are said to have died of it in some epidemics, and blindness was a common sequela. Inoculation for smallpox was practised there before it was in vogue in Britain. Two methods were used: One called *tishteree el*

jederee, in which a piece of rag was tied round the arm of an infected person and then transferred and tied on to the arm of the one to be inoculated. The other, less extensively practised, was called *dak el jederee* ; in this, fluid from a pustule was rubbed into an incision made in the leg of the healthy person, or into a scarified wound. " The pus of a highly infected person was preferred to that of a person lightly afflicted, as it was said that the disease caught from a heavily infected person had spent itself, and therefore would not be so severe to those it attacked next. The mortality among those inoculated was only about two or three per cent., which considering the total mortality was very small." [This experience is more fortunate than that reported by David Livingstone of a village where the inhabitants were inoculated from a patient with a malignant infection and nearly all died. The method of inoculation into a wound recalls that of the negroes of the Gambia who used to practise inoculation using a thorn or a knife- or dagger-point for inserting matter from a variolous pustule.]

In the days referred to by the author, surgical treatment was crude, even barbarous. Wounds, after being washed, were bound up after the application of butter, ground coffee or gunpowder. Fractures " were splinted with palm leaves, but these were put on so tightly that in many cases gangrene supervened. When a limb had to be amputated for surgical reasons, it was stretched through a hole in the wall of a house and severed with a blow of a sword. The stump was then plunged into hot oil to stop the bleeding." The rationale of treating infant diarrhoea by extraction of the teeth and cauterizing the sockets needs some explanation. *H. Harold Scott.*

HILL (T. Rowland). **Tropical Neurasthenia.**—*Lancet.* 1943. Mar. 13. pp. 332–333.

The author's thesis is that there is no real evidence that a tropical climate is a sole cause of neurasthenia, but that the multiplicity of diseases, and possibly malnourishment, form the basis of much of the neurasthenia observed. The discomforts of tropical life no doubt tend to aggravate an existing neurotic tendency, but they do not originate it.

Neurasthenia is a common cause of disability in hot countries, and of 500 consecutive patients admitted to a tropical hospital, the author reports that 50 were suffering from this condition [a list of 52 is given]. In 15 there was evidence of lifelong psychogenic states (10 of these had had recurrent malaria), in 9 hypochondriasis due largely to repeated attacks of malaria, in 6 malarial cachexia, in five conversion hysteria, in three traumatic neuroses, in three alcoholism, in two anxiety neuroses, in two head injury and in seven arteriosclerosis, phthisis or duodenal ulcer. Constitutional neurotic tendencies and long-established neurosis were present in 22 ; recurrent subtertian malaria in 18. Ignorance of tropical disease and hygiene are important factors, and instruction in these subjects should be given to laymen, especially those of poor general education, if they are to serve in the tropics. Established neurasthenics and neurotics should be weeded out by careful psychological examination before they leave for the tropics, as has been done by one large oil company. *C. W.*

YOUNG (Charles T.), COOK (Walter R.) & KAWASAKI (I. A.). **Allergic Rhinitis and Asthma in Hawaii.**—*War Medicine.* Chicago. 1943. Mar. Vol. 3. No. 3. pp. 282–290.

This study was carried out in Oahu, an island with a semi-tropical climate, with little variation in temperature and barometric pressure throughout the year, and with a perennial type of native flora. In patients who develop the rhinitis the serous discharge is a severe symptom; it is not seasonal but persists through the year.

The authors classify their asthma patients into exogenous and endogenous types, the latter mostly giving no reaction to cutaneous tests and often showing no symptoms for several months after arriving in the island. Then they suffer from bronchitic attacks with, in many cases, residual asthma. Those of the exogenous type react to cutaneous tests, often have an allergic rhinitis and the symptoms of asthma develop insidiously. They suffer more in the dry hot season, whereas the endogenous suffer more in hot damp weather.

In the Hawaian islands there are more than 200 grasses; many grow all the year round, but growth and pollination are greatest in the warmer months, March-October. Ragweed is not common and there is no reason for suspecting it to be the cause of allergic rhinitis and exogenous asthma. On the other hand, the kiawe tree, the algeroba, is important; it is generally distributed, grows readily and pollinates perennially, especially from March to September. Local dust containing pollen of many grasses, herbs, shrubs and trees is of major importance in causing the rhinitis. Antigens for testing were prepared locally and a table gives the results of testing 220 patients with 24 antigens. Incidence rises in March and begins to fall in October, when the cooler rainy season comes and cleanses the air of pollen. More patients were found to react to algeroba pollen than to any of the others. Many benefited from desensitization with local dust and a mixture of grasses and with algeroba pollen, but numerical evaluation is not possible because some left, time-expired, and others were evacuated to the mainland on account of the severity of their symptoms.

H. Harold Scott.

CLENCH (William J.) & KONDO (Yoshio). **The Poison Cone Shell.**—*Amer. Jl. Trop. Med.* 1943. Jan. Vol. 23. No. 1. pp. 105–121. With 13 figs. (6 on 1 plate).

This is an interesting paper and important at the present time when armed forces are operating in the Pacific. [The title of the article is not very well chosen, for it is not the shell but the bite of the shellfish which is poisonous.] The shell is an attractive one and lures collectors to pick it up; the fish protrudes a stylet-like proboscis and injects its poison. The author has done good service in reviewing the literature for recorded cases and has reported 17 in full, dating from 1848 to 1939, and including one of which two notices have already appeared in this *Bulletin* [1936, Vol. 33, pp. 476, 722]. The symptoms may be severe and indeed fatal—acute local pain, swelling, numbness, perhaps spreading paralysis and, later, gangrene; thick speech, dimness of vision, drowsiness which may end in coma and death.

A graphic account is given of an encounter between a *Conus textilis* and a small octopus ending in the death of the latter. A series of line drawings demonstrate well the anatomy of the shellfish and a plate shows the beautiful markings of the shells of six species of Conus.

H. Harold Scott.

ALAMEDA COUNTY MOSQUITO ABATEMENT DISTRICT ANNUAL REPORT 1942. 39 mimeographed pp. With 7 graphs. 1943. Feb. California: Court House, Oakland.

DE MEILLON (Botha). Estação anti-malárica de Lourenço Marques. *Simulidae* e *Ceratopogonidae* (Dipt. Nematocera) da Colonia de Moçambique. [**Simuliidae and Ceratopogonidae of Mozambique.**]—27 pp. With 4 figs. 1942. Lourenço Marques. Imprensa Nacional de Moçambique.

BRODY (Arthur L.) & KNIPLING (Edward F.). **Can Larvae of** *Cochliomyia americana* **C. and P. mature in Carcasses ?**—*Jl. Parasitology.* 1943. Feb. Vol. 29. No. 1. pp. 59–60.

The true screw worm *Cochliomyia hominivorax* (*americana*) is normally an obligatory parasite causing myiasis in animals and man. In nature the untreated animal becomes subject to multiple infestations and finally dies. It is of some importance to know whether the maggots can continue their development in the carcass to produce flies. Experiments by the authors show that if the carcass is protected from other flies, development can proceed just as in the living tissues. But under normal conditions the carcass is rapidly invaded by many carrion-feeding maggots which compete with the screw worms so successfully that almost none of these reach maturity.

V. B. Wigglesworth.

SABIN (Albert B.) & RUCHMAN (Isaac). **Characteristics of the Toxoplasma Neutralizing Antibody.**—*Proc. Soc. Experim. Biol. & Med.* 1942. Oct. Vol. 51. No. 1. pp. 1–6. With 2 charts.

In previous papers SABIN and OLITSKY, and SABIN have shown that rhesus monkeys infected with toxoplasma develop antibodies in the blood as demonstrated by reduction in size of the skin lesion in rabbits, produced by the intracutaneous inoculation of emulsion of mouse brain, when to this emulsion is added serum in dilution of 1 in 10 to 1 in 100. In carrying out these tests it was noted that certain sera from recovered monkeys failed to give any protection and it was erroneously concluded that antibodies disappeared from the blood soon after recovery. It has now been found that if perfectly fresh sera are employed for the test antibodies can be demonstrated several months after recovery. Furthermore, the inoculation of fresh animals from the recovered monkeys has not led to infection, showing that the persistence of antibodies is not due to continued infection. It was found that the antibodies are destroyed by half an hour's exposure to a temperature of 56°C. and that the previous erroneous conclusions were due to the fact that a similar destruction occurred, but more slowly, at the ice-box temperature of 5°C. at which the sera were stored. It was proved that the destruction involved the antibodies themselves and was not an apparent destruction due merely to disappearance of complement. In order to preserve the antibodies it was necessary to store the sera at the low temperatures provided by CO_2 snow or to dry them in the frozen state. Under these conditions antibodies persisted in the sera for at least 14 months. Tests carried out with the serum from a case of toxoplasmosis in an eighteen-months-old infant showed that it had similar properties to those of the sera of infected monkeys. It was not possible to demonstrate neutralizing antibodies in the sera of infected rabbits, mice, cats and dogs.

C. M. Wenyon.

SABIN (Albert B). **Toxoplasma Neutralizing Antibody in Human Beings and Morbid Conditions associated with it.**—*Proc. Soc. Experim. Biol. & Med.* 1942. Oct. Vol. 51. No. 1. pp. 6–10.

By means of the rabbit skin test described in the preceding paper a survey of the sera from 151 selected individuals was carried out. The skin test was standardized so that comparable results were obtained. Two brains of mice which had died four days after intracerebral inoculation of toxoplasma material were ground in a mortar and Tyrode's solution added to make a 10 per cent. suspension of the brain substance. The suspension was allowed to stand for half an hour in an ordinary refrigerator. The opalescent supernatant fluid was then separated and was considered to represent a 1 in 10 dilution. From it by addition of Tyrode's solution other dilutions were made. For skin inoculation 0·15 cc. of one or other of the dilutions was mixed with 0·15 cc. of serum to be tested, or with the same volume of Tyrode's solution for the control. The toxoplasma skin lesion is fully developed by the 7th or 8th day, after which it begins to blanch. The rabbits generally die of a generalized infection on the 9th to the 12th day. In the case of positive sera the 1 in 20 and 1 in 100 dilutions of toxoplasma material produced distinct lesions, while in the case of strongly positive sera the 1 in 100 dilution failed to produce any lesion. With the controls the 1 in 1,000 dilution always and the 1 in 10,000 dilution frequently gave rise to lesions. With this procedure 59 of the 151 selected cases were positive. A high incidence of positive tests was found in children and infants presenting psychomotor disturbances, with or without hydrocephalus or microcephaly, only when these were associated with cerebral calcification or choroido-retinitis in the macular region, or both. The congenital character of the disease was confirmed by the regular presence of antibodies in the mothers of the affected children. Cases of choroido-retinitis of the macular region in otherwise normal children and adults were associated with antibodies 9 times out of 10.

C. M. Wenyon.

WARREN (Joel) & SABIN (Albert B.). **The Complement Fixation Reaction in Toxoplasmic Infection.**—*Proc. Soc. Experim. Biol. & Med.* 1942. Oct. Vol. 51. No. 1. pp. 11–14.

With the tissues of infected rabbits and mice attempts were made to prepare antigens which would fix complement, with the object of rapidly diagnosing toxoplasma infections. The only success was obtained with an antigen made by freezing and thawing a suspension of heavily infected rabbit brain. With this antigen it was possible to demonstrate the presence of complement-fixing antibodies in the blood of experimentally infected monkeys 1 to 4 weeks after inoculation, but unlike the neutralizing antibodies, the presence of which can be proved by the rabbit skin test, they disappeared sometimes as early as two months. A certain number of human beings who were known or suspected to have toxoplasma infection also gave positive complement fixation reactions. However, 20 individuals whose sera had been shown to contain neutralizing antibodies gave negative reactions, but in none of these cases was the toxoplasmic infection of recent date. Though it is admitted that a positive complement fixation reaction does not in all cases indicate active or even recent infection, it is

believed that the test described may have great usefulness in the rapid diagnosis of active toxoplasmosis. *C. M. Wenyon.*

WARREN (Joel) & SABIN (Albert B.). **Effect of certain Antiprotozoal Drugs on Toxoplasma *in vitro* and *in vivo*.**—*Proc. Soc. Experim. Biol. & Med.* 1942. Oct. Vol. 51. No. 1. pp. 15–18.

SABIN (Albert B.) & WARREN (Joel). **Therapeutic Effectiveness of certain Sulfonamides on Infection by an Intracellular Protozoon (Toxoplasma).**—*Ibid.* pp. 19–23.

In the first of these papers are recorded experiments on the action of certain therapeutic agents on toxoplasma infections in mice and rabbits. As a preliminary the effect of the drugs on the parasites outside the body was studied by adding the drugs in varying concentrations to toxoplasma-containing peritoneal exudate from infected mice. After the drug had acted for some time at 37°C. the viability of the parasites was tested by inoculation of mice. In this type of *in vitro* test it was found that atebrin in a concentration of 1 : 50,000 rendered the toxoplasms non-infective in less than three hours. Trypaflavin, rivanol lactate, potassium antimony tartrate, optochin, mapharsen, neosalvarsan, tryparsamide and quinine hydrochloride in higher concentrations gave the same result in more than three hours. Atebrin was thus the most effective agent. On the other hand, stibosan, 4 : 4′ diamidino stilbene, sulphanilamide, sodium sulphathiazole and sulphapyridine were without any effect even after 24 hours' exposure. When all these drugs were administered parenterally to mice and rabbits immediately after injection of the toxoplasma and once or twice daily after they had no therapeutic effect whatever.

ii. In the second paper an account is given of a further series of tests in which the blood concentration of the drugs was maintained by administering them in 1 per cent. concentrations in the food. In this way it was shown that sulphathiazole and sulphapyridine, although ineffective *in vitro*, when given to mice injected with 100 m.l.d. or less for 18 days cured them, although they failed to cure mice injected with 1,000 or 10,000 m.l.d., the mice dying of their infections at varying intervals after administration of the drugs had ceased. Sulphanilamide did not have a similar effect. Owing to the irregular feeding habits of rabbits sulphathiazole failed to cure them of toxoplasma infections, but when large doses were given parenterally at regular intervals day and night a distinct curative effect was obtained. Atebrin and quinine hydrochloride were without effect on the infection when administered in the food. *C. M. Wenyon.*

FISCHBACH (Hans-Werner). Ueber die hygienische Gestaltung moderner Tropenwohnhäuser einschliesslich Klimatisierung. [**On the Modern Hygienic Construction of Tropical Dwelling Houses, including Air-Conditioning.**]—*Deut. Trop. Ztschr.* 1942. Nov. 15. & Dec. 1. Vol. 46. Nos. 22 & 23. pp. 553–564 ; 575–586. [62 refs.]

Earlier work on the physiological effects of the environment on the human body is reviewed. The influence of temperature and humidity on bodily heat loss is discussed, together with the effects on skin temperature of sensible and insensible perspiration. The preservation

of normal body temperature is necessary for continued comfort; if this temperature rises unduly it is likely to cause an increase in the pulse and respiration rates. Vomiting and fainting may ensue, leading in extreme cases to heat stroke, heat cramps, hallucination and general equilibrium disturbance. It has been found that even in resting subjects at an air temperature of 33°C. and a relative humidity of 90 per cent. the body temperature rises 0·3°C., and that there is some acceleration in pulse rate.

Sweating, also, can impose a strain on the human body. In many people it induces exhaustion in some degree, and this, if continued, may cause a general listlessness, together with insomnia. These phenomena are not uncommon even in Central Europe during hot weather. The salt loss from the body is probably one of the factors contributing to the harmful effects due to sweating.

The European who is acclimatized to the more temperate zones of the continent is affected by the climatic changes when transferred to the tropics and the general lowering of body tone also reduces his power of resistance to illnesses and fevers. The author suggests that much could be done to ameliorate general living conditions by paying greater attention to the construction of dwelling houses in the tropics. Various existing types of structure are described and the relative merits of brick, stone and wood as insulators against heat are discussed. The usual European house is not serviceable in the tropics; it gives little protection from the heat, due to intense solar radiation, and affords much harbourage for insects and vermin. The bungalow type of structure is recommended, particularly if it has low, shaded verandahs. The outside walls and the roof should be of sufficiently solid construction to keep out radiant heat effects: in this respect the use of suitable insulating materials is also stressed. Floors and inside walls should be as smooth and level as possible, thereby reducing haunts for insects, etc., to a minimum. Particular attention should be paid to the arrangement of doors and windows in the rooms so that fuller benefit may be obtained from increased air movement. Fans are helpful in moving the air, but although general building costs are usually not excessive, the provision of electric current in many places is still something in the nature of a luxury. In spite of this, however, the author goes on to recommend the use of apparatus which will further condition the air in tropical dwelling houses, as he feels that such benefit is long over-due. Small electrically operated air-conditioning units are now available which can cool and dehumidify the air. A relative humidity of the order of 55 per cent. is quoted as a desirable figure to attain. The units are capable of producing a comfortable "micro-climate" in a room of average size (say $4 \times 4 \times 3$ m.) and being portable they can readily be taken from room to room as desired.

The assessment of an environment from the subjective point of view is described and the American Effective Temperature scale is suggested as a useful index. Although air-conditioning will be beneficial in the tropics the danger from "cold-shock" on entering a cooled environment from a warm outside condition must not be overlooked. German engineers have stated that for an outside temperature of 35°C. a room temperature of 27°C., with a relative humidity of 60 per cent., can be tolerated on entering, but the author feels, that for Europeans, this temperature drop of 8°C. may be somewhat excessive.

C. G. Warner.

SCHARFF (J. W.). **The Use of Sullage-Water Precipitate in making Compost.** -*Jl. Roy. San. Inst.* 1943. Apr. Vol. 63. No. 2. pp. 92–94. [Summary appears also in *Bulletin of Hygiene.*]

It is a curious fact that in all the thought so properly given to the disposal of waste matters of various kinds in Britain, attention has in the past been directed mainly to their destruction or dissipation rather than to their utilization for useful and beneficial purposes. The development of the "Indore Process of Composting" has gone far toward correcting this and, with the added inspiration of necessity in wartime, attention is now focussed upon the means "by which almost any kind of mixed animal and vegetable refuse can be manipulated so as to destroy by continued fermentation, pathogenic or other noxious matter. This biological process of controlled and orderly decay brings about the rapid conversion of complex organic substances into humus, a valuable plant food, and the essential ingredient of fertile soil." Ordinary sludge from a sewage purification plant, or the precipitate resulting from the clarification of sullage water by the use of ferrous sulphate and lime, as now practised where necessary in army camps, can be utilized with ordinary vegetable wastes to assist the fermenting process and the production of humus.

In this article the author outlines a method of composting with sullage precipitate, carried out at the Army School of Hygiene. The method dealt with is designed for use in places where suitable waste matters available for composting are limited to comparatively small quantities.

The necessary equipment consists of a couple of boxes set side by side, each four feet square and four feet deep. The roughest type of boarding is suitable, and joints between the boards should be about one inch in width to allow of free circulation of air through the contents when full. One side of each box is made removable, so that the material can be readily turned out in the process of compost making. The boxes are fixed over a channel filled with coarse rubble for drainage, also to provide ventilation.

Materials composted consist of weeds, grass, bracken, and some animal wastes—in this case bedding from rabbit hutches. The mass must be kept moist—water may be used if required. Urine is valuable for this purpose, but sludge or sullage precipitate are equally suitable. The materials are filled into the boxes in layers, and a sprinkling of sifted top soil, or of mature humus, is included at each foot of depth.

The boxes are used in rotation, a fortnight being allowed in which to fill each box.

At no stage in the filling should the material be compressed. It sinks considerably of its own accord during the filling and subsequent fermentation process. As an aid to ventilation a stake is driven through the centre of the mass to the bottom; this can be rotated to form a vent, and it can be used to observe variations in temperature.

At the end of the first month both boxes are full: by this time also the material in the first box will have rotted sufficiently to be ready for turning out. Thus one box is emptied and ready for refilling on each succeeding fortnight.

When turned out the material is stacked in the open air. The effect of this, following the preliminary period of maturation is to bring about conditions favourable to further fermentative changes. At the end of two or three weeks these are complete and the humus is ready for use.

The amount of humus formed within each box weighs approximately half a ton, thus, within two months of starting, by continual working, the amount produced may be at the rate of one ton a month, sufficient to meet the needs of one or two acres of land indefinitely.

The measurements given for the boxes are the smallest which can be expected to function effectively. To conserve heat in cold weather the boxes may be insulated on the outside with any available material, *e.g.*, bracken, straw, hay, etc.

The utilization of organic wastes by a method of this kind is a most valuable aid in the maintenance of soil fertility ; at the present time a matter of exceptional importance. *Henry H. Clay.*

BOOK REVIEWS

CLAVERO (G.) & PÉREZ GALLARDO (F.). **Tifus exantemático. Etiologia—Clinica—Profilaxis.** [Exanthematic Typhus.] Prólogo del Prof. Dr. J. A. PALANCA.—166 pp. With 41 figs. on 16 plates. [Bibliography.] 1941. Madrid : Gráficas Afrodisio Aguado, S.A., Barquillo 4.

This is an excellent book ; it gives a clear, concise and up-to-date account of every aspect of louse-borne typhus fever. The authors have had exceptional opportunities for observing the disease in the recent epidemics in Spain and they have also embodied the results of a close study of the literature of the subject. The other fevers of the typhus group are briefly described and their relationship to louse-borne typhus is discussed in the light of modern research.

There are few grounds for criticism, but exception must be taken to the classification of the Rickettsiae quoted by the authors and referred to by them as being " the most acceptable up to the present time." In this the virus of dengue is included as an unnamed Rickettsia, while the virus of tick-borne typhus is excluded and is described as belonging to a different genus altogether. But in the other parts of the book this bewildering classification is not followed ; no further reference is made to dengue as a Rickettsial disease and due emphasis is laid on the close relationship between tick-borne typhus and the other fevers of typhus group. The difficult problem of murine Rickettsiae is dealt with in a broad-minded and impartial manner.

There are 41 excellent illustrations. A useful bibliography is also given of the recent literature from 1939 to the early part of 1941.

It is a pity that there is no corresponding book in the English language, but the literary style is so clear and simple that any one who can read French or Italian will have little difficulty in following the text. The book will appeal to laboratory workers as much as to clinicians and epidemiologists. *John W. D. Megaw.*

GREGG (A. L.) [M.A., M.D., M.Ch., B.A.O. (Dublin), D.T.M. & H. (Lond.), L.M. (Rotunda Hospital), etc.]. **Tropical Nursing. A Handbook for Nurses and others going abroad.** With a Foreword by the Hon. Sir Arthur Stanley, G.B.E., C.B., M.V.O. 2nd Edition.—pp. x+185. With 13 figs. 1943. London, Toronto, Melbourne & Sydney : Cassell & Company, Ltd. [6*s*.]

The field of nursing, like the field of medicine, has become very much widened in recent years. Nursing in the tropics now includes in its

scope not only the care of the sick from the clinical point of view but also many other nursing matters of an administrative, preventive and social nature.

Thus the nurse in the tropics, as at home, may be concerned with the patient as a sick individual suffering from a disease in which certain signs and symptoms, physical and psychological, have to be noted, and for which the appropriate nursing treatment must be provided. She may also be concerned with the patient as a victim of certain environmental conditions which gave rise to the sickness, and for which the appropriate advice and treatment are required.

Yet again, the nurse in the tropics may be concerned with the provision of a suitable hospital environment, arranging and adapting such things as hospital equipment, ward routine, diet and general living conditions, as far as possible in a manner suited to the climate, to the materials available and to the customs of her patients. She will most likely be concerned not only with the nursing of Europeans but also with the care of the local inhabitants. In this work she will be assisted increasingly by a native staff, for part of the training of which she will be responsible.

A complete text-book on tropical nursing, therefore, would have to cover a very wide field to be of universal use.

The author of this text-book concerns himself with the subject mainly from a clinical point of view. Section I (five pages), deals with personal hygiene in the tropics, giving a brief and useful account of what a nurse should do in order to keep herself healthy in a tropical environment.

Section II, the main part of the book (140 pages), deals in alphabetical order with the chief so-called "tropical" diseases. These are explained very clearly and concisely, their causes, clinical course, medical and nursing treatment, and prophylaxis being described.

Section III (18 pages), is concerned with certain forms of technique, which are associated with these diseases. The methods of making thin and thick blood films are included, a useful and necessary technique for all nurses in the tropics where the results of blood examination depend so greatly on proper film making.

Section IV (four pages), deals with the important subject of the care of the eyes in the tropics in an admirably succinct and practical manner.

The book is compact, printed clearly on excellent paper, and, though of limited scope, should prove a useful guide and book of reference in tropical diseases for those engaged in the field of clinical nursing in warm climates. *Mary Blacklock.*

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